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ABSTRACT

This volume contains 411 abstracts of papers accepted for presentation in the Research Consortium sessions of the 1987 American Alliance for Health, Physical Education, Recreation and Dance Convention in Las Vegas, Nevada. Abstracts of presentations made in the symposia are presented first, followed by those in the free communication sessions, and finally those in the post sessions. The presider for each session is presented in the table of contents. The dates and times of presentation are listed in the lower left hand corner of each abstract. (JD)

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ABSTRACTS

of Research Papers 1987

Harold H. Morris, Editor
Indiana University

Jane E. Clark, Symposium Abstracts Editor
University of Maryland

Presented at the Las Vegas, Nevada Convention of
American Alliance for Health,
Physical Education, Recreation and Dance
in the Research Consortium Meetings

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Purposes of the American Alliance For Health, Physical Education, Recreation and Dance

The American Alliance is an educational organization, structured for the purposes of supporting, encouraging, and providing assistance to member groups and their personnel throughout the nation as they seek to initiate, develop, and conduct programs in health, leisure, and movement-related activities for the enrichment of human life.

Alliance objectives include:

1. Professional growth and development – to support, encourage, and provide guidance in the development and conduct of programs in health, leisure, and movement-related activities which are based on the needs, interests, and inherent capacities of the individual in today's society.
2. Communication – to facilitate public and professional understanding and appreciation of the importance and value of health, leisure, and movement-related activities as they contribute toward human well-being.
3. Research – to encourage and facilitate research which will enrich the depth and scope of health, leisure, and movement-related activities; and to disseminate the findings to the profession and other interested and concerned publics.
4. Standards and guidelines – to further the continuous development and evaluation of standards within the profession for personnel and programs in health, leisure, and movement-related activities.
5. Public affairs – to coordinate and administer a planned program of professional, public, and governmental relations that will improve education in areas of health, leisure, and movement-related activities.
6. To conduct such other activities as shall be approved by the Board of Governors and the Alliance Assembly, provided that the Alliance shall not engage in any activity which would be inconsistent with the status of an educational and charitable organization as defined in Section 501(c) (3) of the Internal Revenue Code of 1954 or any successor provision thereto, and none of the said purposes shall at any time be deemed or construed to be purposes other than the public benefit purposes and objectives consistent with such educational and charitable status.

Bylaws, Article III

PREFACE

Abstracts of papers accepted for presentation in the Research Consortium sessions of the 1987 AAHPERD Convention in Las Vegas are published in this volume. A total of 411 abstracts were submitted for review. Each abstract was evaluated by three reviewers, who were recommended by the various associations, ARAPCS councils, and NASPE academies. Over 100 individuals were involved in the review process -- their names and institutional affiliations are listed on the following pages. Additionally, this volume contains abstracts of papers presented in ten symposia accepted following a similar review process coordinated by Dr. Jane Clark of the University of Maryland, Secretary of the Research Consortium. The titles of Invited Research Tutorials are also listed.

Abstracts of presentations made in the symposia are presented first, followed by those in the free communication sessions, and finally those in the poster sessions. The presider for each session is presented in the table of contents. The dates and times of presentation are listed in the lower left hand corner of each abstract.

Thanks are extended to B. Don Franks and Emily Haymes for their numerous helpful suggestions and to Jane Clark for her contributions as the coordinator of the symposia selection process and for serving as the editor of the symposia section of this volume. Ray Ciszek, Gladys Merrick, and Lysa Frisella as well as numerous others at AAHPERD headquarters are thanked for their assistance throughout the review and publication process. The reviewers and presiders are thanked for their cooperation and assistance. Thanks to Deb DeBoe and Mike Lacourse who assisted with the numerous details. Special thanks go to Marilyn Saum, who spent numerous hours in typing, sorting, answering phone inquiries and various other tasks associated with the review, selection, and publication process.

The contributions of presenters, presiders, organizers, and reviewers together enable the Research Consortium to provide the various associations, councils and academies with forums for the dissemination of research at the annual AAHPERD

Convention. This has become an increasingly important component of the convention and has enabled AAHPERD to provide a multidisciplinary program of research that serves the respective disciplines in the highest manner.

Harold H. Morris
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REVIEWERS

The following individuals served as reviewers for the symposia:

Bonnie Burger	Brooklyn College
Jane Clark	University of Maryland
Diana Dunn	Pennsylvania State University
Pat Frye	Ithaca College
Barry McKeown	University of Texas at Arlington
Mary Lou Remley	Indiana University - Bloomington
Michael Young	University of Arkansas

The following individuals served as reviewers for the abstracts submitted for the 1987 AAHPERD Convention:

Wesley Alles	Pennsylvania State University
Dean Anderson	Iowa State University
Stephen Anderson	Indiana University - Bloomington
Rosemary Aten	Western Illinois University
Kate Barrett	University of North Carolina - Greensboro
Stanley Bassin	California State Polytechnic - Pomona
Ted Baumgartner	University of Georgia
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Michael Young	University of Arkansas - Fayetteville
Carole Zebas	University of Kansas - Lawrence
Earle Zeigler	University of Western Ontario
Howard N. Zelaznik	Purdue University

SPECIAL SESSIONS

Tuesday, 10:45 a.m.
Research Consortium and The American Academy of Physical Education, "Body Composition Assessment in Children and Youth with Implications for the Prevention and REgulations of Obesity"
Presider: B. J. Franks, University of Tennessee
Speaker: Timothy G. Lohman, University of Arizona, Tucson

Wednesday, 9:00 a.m.
AAHPERD Alliance Scholar
Margaret J. Safrit

Wednesday, 2:00 p.m.
Research Consortium, "Athletic Amenorrhea and Premature Bone Loss"
Preisder: Emily M. Haymes, Florida State University
Speaker: Barbara Drinkwater, Department of Medicine, University of Washington, Seattle

Thursday, 7:30 a.m.
C. H. McCloy Lecture Breakfast
Henry J. Montoye, University of Wisconsin

Thursday, 10:45 a.m.
Research Consortium Business Meeting

Thursday, 2:00 p.m.
Research Consortium, "Learning via Patterned Electrial Stimulation in Recovery from Stroke Paralysis"
Presider: Gary Kamen, Indiana University - Bloomington
Speaker: Walter Kroll, University of Massachusetts

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Presider: Joan Hult, University of Maryland
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TO BE OR NOT TO BE, THAT IS THE QUESTION: WOMEN IN LEADERSHIP

The gradual diminution of women as leaders of sport in the nation's schools and colleges is an acknowledged phenomenon. The total numbers of women as well as the percentages of women who hold positions as coaches, officials and administrators of sport have been decreasing over the past ten years. Especially problematic is the loss of women in primary decision making positions. The symposium will address the issues emanating from this reality by exploring the dilemma from the perspectives of higher education and secondary education. Further, an attempt to examine women who endured versus those who departed the ranks of primary administrator will be pursued.

Women in Intercollegiate Sport 1977-1987: A Longitudinal Study.

Vivian Acosta, Brooklyn College.

The architecture of sports for girls and women in the United States has changed remarkably in the last one and a half decades. The style of change has been the result of such factors as: society's increasing acceptance of women in sport, the life and death of AIAW and Title IX, and the accession to governance of women's intercollegiate sports by the NCAA. A national longitudinal study was launched in 1977 to document the changing architecture of women's sports and a nine-year update of that study will be discussed. In brief, although the opportunities for female athletes to participate in intercollegiate sports have substantially increased during the past nine years, the decrease in the number of women in leadership positions has been massive. The causative mechanisms have been studied; the perceptions of males and females about those mechanisms have been compared; and proposed solutions have been developed.

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Tuesday, April 14
9:00-10:30 a.m.

Women in High School Sport: How Do They Fare? Susan Schafer, Colorado Department of Education.

The purpose of the presentation will be to trace the decline of women as high school coaches, officials and athletic directors over the past decade and to present programs and policies to counteract the trend. Model programs in various states will be discussed. High school and college women must mobilize with networks, infiltration, mentor systems and leadership seminars to ensure employment and advancement for women in high school sport.

Women Who Stayed: Ten Year Veterans and Their Experience (1976-1986). Pat Rosenbrock, Bemidji State University.

This study focused on the perceptions of experienced women athletics administrators regarding the effects of social change on the lives of women sport professionals. The interviewees for this study were randomly drawn from a sample of "primary women administrators" currently holding positions in NCAA Division IA institutions. Only women who had held their administrative positions a minimum of ten years were included in the research population. Major questions addressed by this research were: What were the major changes these women administrators experienced over the past ten years? Did they perceive that women athletes and women professionals are better-off as a result of these changes? Did the nature and level of their commitment to intercollegiate athletics change as women's sport changed? How have these women adjusted to movement away from a gender-separate, woman-focused, woman-controlled governance environment to a gender-merged environment developed by men, for men?

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Women Who Departed: Over, Down, or Out (1975-1985). Jackie Disselkoen, North Texas State University.

Reasons why women are scarce in decision-making positions may remain vague because women who have held those positions have not been asked what happened to make them want to leave. A query into job loss/change was made with a slighted population of women who are former athletic directors of intercollegiate athletic programs during the years 1975-76 and 1985-86. What happened to make them leave and how their departing experience has influenced what they are now doing is explained from information elicited during personal interviews with thirty-one of those women. An attempt to examine women who departed from the position of decision maker and leader might appeal to coaches, athletic directors, educators, and administrators in related fields. Researchers interested in job loss/change may benefit from the findings.

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HOW SHOULD MOTOR DEFICIENCY IN THE MENTALLY RETARDED POPULATION BE CONCEPTUALIZED?

The symposium will discuss how motor deficiency within the nonorganic mentally retarded (MR) population should be conceptualized. The purpose is to update those attending on current theories and viewpoints and to stimulate discussion and thinking concerning critical analysis of these viewpoints and future research directions. The symposium will include discussions of: 1) current knowledge regarding the motor development of MR children, 2) the explanation of a developmental delay or different mechanisms as a root cause, 3) a possible information process deficiency, 4) a possible motor control deficiency, 5) the possible impact of rate limiters and (6) a reaction and analysis of presented viewpoints.

Motor Deficiencies of MR Individuals -- Why? Patrick DiRocco, University of Maryland.

The purpose of this presentation is to set the tone for the ensuing discussions. Current knowledge regarding the comparative status of motor development of mentally retarded children as opposed to nonhandicapped peers will be reviewed. The basic question of whether the discrepencies are a result of developmental delays or a result of different and less efficient processes will be explained. A working definition for the concepts of coordination and control will be given as a basis for the remaining topics.

Motor Deficiency: An Information-Processing Viewpoint. John Hoover, Murray State University.

The movement mechanism of humans can be globally divided into structural and control parameters. If likened to a computer, the structural parameters would be the hardware and the control parameters the software. Many researchers in the field of psychology and those areas encompassed by the term motor learning view motor deficits of the mentally retarded population as emanating from a deficiency in the control mechanism. A model describing motor deficiency as an information-processing problem will be presented. Research concerning motor memory deficits will be discussed and further research questions will be posed.

Patrick J. DiRocco
Department of Physical Education
University of Maryland
College Park, MD 20742

Tuesday, April 14
2:00-3:15 p.m.

Motor Deficiency: A Motor Control Problem. Walter Davis, Kent State University.

There is no clear understanding of the nature of motor deficiency in mental retardation in spite of numerous studies demonstrating such deficiency. Most of these studies have focused on global measures of performance and have lacked a firm theoretical basis. One alternative approach to the study of motor behavior has been the coordination and control perspective. In this approach, coordination is defined as the process that constrains the system's free variables into a behavioral unit and control is the process by which the values are assigned to that behavioral unit. Research evidence supporting the hypothesis that mentally handicapped subjects differ from their non-handicapped peers only on parameters of control and are equated on coordination are summarized. Questions regarding the distinction between coordination and control are addressed and further research questions are posed.

Motor Deficiency: The Impact of Rate Limiters. Patrick DiRocco, Jane E. Clark, and Sally J. Phillips, University of Maryland.

The concept of a deficiency in an underlying factor, such as equilibrium skills or strength, resulting in a slower rate of development or an abnormal developmental sequence of coordination will be discussed. Evidence from studies by the presenter and colleagues and other authors will be presented. It will be suggested that rate limiters may be a causal factor for some developmental delays in motor skills and for some unusual developmental sequences of coordination that are observed within the mentally retarded population. Thus, this would lend support to the concept that motor deficiencies in the mentally retarded population result from developmental delays.

Patrick J. DiRocco
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CARDIAC AND SKELETAL MUSCLE CHANGES IN OLDER ADULTS

With the passage of time the human organism declines in all functional components of the body. Those changes that contribute greatly to this decline are the heart and skeletal muscle. In population studies, the cardiovascular system declines in function after the age of 35 by 0.75% per year. These declines, however, have been observed in the general population in which cardiovascular disease is prevalent. When disease states are separated out, increased loss of function is much less than earlier anticipated. The decline in strength and skeletal muscle is an important factor in man's ability to interact with his environment. These declines are clearly demonstrated in hand and quadricep muscle strength. The ability of the skeletal system to regenerate with age has been a concern for physical activity programming. Does aging muscle have the capabilities to adapt under conditions of increased stress, damage due to accidents or in disease states? The satellite cell which is observed to still main function in advanced years can still regenerate muscle tissue. While the aging heart and skeletal muscle decline, these declines are much less evident in the active healthy older adult.

The Heart in the Aging Process. Ed Lakatta, John Hopkins School of Medicine, Baltimore, Maryland

A complex interaction of modulating influences controls the cardiovascular function. Five factors interact in determining cardiac output, intrinsic cell performance, heart rate, load prior to shortening, coronary flow and load during shortening. Each factor may be individually identified and studied, but each is also modulated by and determined in part by autonomic tone. It is difficult to separate disease states from the aging process in the older adult where significant declines at rest and during exercise are reported. Cardiovascular function, however, in older adults free from coronary disease is not markedly effected by age. The lessened decline in function is evident both at rest and during exercise. Cardiovascular response to exercise has been observed to decline with age, but the decline is signficantly decreased in healthy active individuals.

Everett L. Smith
University of Wisconsin
Madison, WI 50706

Tuesday, April 14
3:45-5:30 p.m.

__Muscle Mass Decline with Age.__ Ed Schultz, University of Wisconsin, Madison

By age 80, the average man has 40% less muscle mass than a 30 year old. Decline in muscle strength parallels the decline in muscle mass. Functional declines are preceded by morphological involution of skeletal muscle. Vastus lateralis muscle biopsies from 51 men (ages 20-65) showed that type II fiber area declined in men over 50 years of age. This decline in type II fiber area parallels the decline in strength and velocity of contraction in other studies. In active men, decrements in muscular strength are less than in the general population. Whether skeletal muscle can be maintained, regenerate after damage and hypertrophy in the older adult is a major area of current research. Most of this research centers around the satellite cell, which rests between the sarcolemma and the basal lamina of skeletal muscle. Satellite cells are active in the growth and regeneration of muscle tissue.

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DANCE MOVEMENT ACTIVITIES: IMPLICATIONS FOR USE AS THERAPEUTIC INTERVENTION

The purpose of the symposium is to summarize, discuss and provide recommendations for field-based research related to dance movement activities with a variety of treatment populations. Presentations will focus on the use of dance activities as a therapeutic mode of intervention with older adults afflicted with Parkinsons disease, or who experience social isolation or long-term grief. In addition, case studies of disabled students paired with gifted students in a performance project will be presented.

Use of Dance/Movement as Ameliorant with Parkinsons Disease Patients. Erna Caplow Linder and Leah Harpaz, 92nd St. YM-YWHA and Nassau Community College.

Parkinsons disease is characterized by progressive neuromuscular deficiencies. Therefore, severe physical and psychosocial losses are incurred. Therapeutic dance/movement offers the person with limited physical and vocal abilities the opportunity for expression and communication; it raises energy levels, encourages increased mobility and physical coordination in a joyous supportive atmosphere from which a Parkinsons disease patient can benefit. This presentation describes two on-going weekly groups. The participants are patients and caretakers of Parkinsons disease patients. The program includes rhythmic exercises with vocalization, use of music and props, and innovative movement techniques. In order to evaluate such a program, it is necessary to consider many variables: inconsistent disease progression, medication effects, irregular attendance, personal and family stresses. Nevertheless, the benefits of dance/movement as an ameliorative element, particularly from a psychosocial perspective, were noted by the participants, their caretakers, the program leaders, family members, and medical personnel.

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Wednesday, April 15
3:45-5:30 p.m.

Take Care of Yourself Program. Jean Snodgrass, George Washington University.

The "Take Care of Yourself Program" is an interdisciplinary project in aging at The George Washington University. medical students are teamed with dance/exercise science students to provide an integrated health care/exercise program in community settings including nutrition sites and senior centers. Objectives for the older adults include development of self-care knowledge and skills, socialization, increased self-esteem, and physical mobility. Students gain practical experience working with older adults, along with knowledge and understanding of the aging process. Both groups gain through interaction in an intergenerational setting. Health education lectures are integrated with a movement/exercise class; in addition, students participate in weekly seminars of related lecture and discussions. At the close of each program at a particular site, final evaluation involves assessment of the program's impact on all of the participants: older adults, students and staff.

A Performance Project Pairing Gifted and Disabled Students. Nancy BrooksSchmitz, Columbia University.

This project involved pairing 7 gifted and 7 disabled students, ages 10-17, to develop a touring performance project. Within a creative process, the project set out to investigate the relationships of students, the growth of skills, interests and self-image of the participants, and audience reaction to performance by students with varying abilities and disabilities. The investigation involved case studies using data from personal inventories, participant journals, observation, and audience surveys. Students involved in this project showed growth in self confidence, sense of belonging, understanding and concern for their peers, and acquisition of new skills; audience members noted broadening of their understanding of disabilities; and staff members noted an understanding of different modes of learning.

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TEACHER DEVELOPMENT: ENHANCING THE CAREER OF TEACHERS

The teaching profession has recently emerged as being in a state of crisis (Darling-Hammond, 1985; Feistritzer, 1985). Report after report has decried the ills of the teaching profession, and state after state has legislated new mandates aimed at improving the condition of teaching and the education of teachers. The recent changes have been developed to address the problem of teaching being a careless profession (California Round Table on Educational Opportunity, 1983). The most frequent changes include the mentor teacher concept, career ladders, the master teacher concept, financial incentives, alternative routes to credentialing, and teaching as a developmental career. The purpose of this symposium is to review the major attempts at restructuring the career development patterns of teachers, and to provide empirical evidence on the success and failure of these recent efforts in enhancing the teaching profession with particular reference to health, physical education, recreation, and dance. The participants in this symposium will discuss the antecedents and effectiveness of teacher development strategies, the California mentor teacher project, the master teacher concept, the career/ladder/lattice concept, and salary incentives for teachers.

The Development Careers of Teaching: A Theoretical Overview.

Terry Boggess, University of Arizona.

Recent models of teacher education have posited that the preparation of teachers can be divided into three distinct periods: preservice, induction, and inservice (Tiosher, 1982; Fensternacher, 1980). Further evidence suggests that teaching is a developmental career in which beliefs, attitudes, and professional concerns change over time (Fuller, 1969; Boggess et al., 1984). The development of teachers has been categorized by three major conceptualizations which have called for significant reform in the preparation of teachers (Lortie, 1966; Stephens, 1969; Wright, 1968). The main purpose of this presentation is to provide a theoretical and empirical framework for teacher development and how it links up to current local and state efforts to improve the career development patterns of teachers.

Bernard Oliver
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Thursday, April 16
9:00-10:15 a.m.

The Career Ladder and Lattice: A New Look at the Teaching Career. Timothy Chandler, Syracuse University.

The recent concern over the quality of teachers staffing the nation's schools has prompted widespread educational reform packages designed to improve the teaching profession. Stemming from this effort has been the notion that the teaching career must be structured and progress from informal elementary instructional tasks to full-time responsibilities in the classroom. The purpose of this presentation is to discuss a revolutionary concept in the preparation of teachers--the career ladder and lattice and its relationship to teacher preparation. In addition, the paper will review existing career ladder/lattice programs that have been implemented in a number of states (i.e., Utah, Tennessee, etc.).

What's a Master Teacher? Can Research Tell Us? Lynn Housner, New Mexico State University.

The recent surge of national and local reports on the teaching profession has devoted considerable attention to enhancing the career development of teachers. Of particular interest has been the implementation of various strategies to attract and retain teachers in the profession (Reed & Busby, 1984). One of the more popular career development strategies has been the master teacher concept (Doyle & Hartle, 1984). The purpose of this paper is to develop and review the historical and philosophical underpinnings of the "master teacher" concept. In addition, the presentation will focus on the problems encountered by state and local education agencies in implementing master teacher programs.

Bernard Oliver
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Teacher Development and Job Incentives: A Psychological View.

Bernard Oliver, Syracuse University.

Over the last decade the teaching profession has become known as the "imperiled" profession (Kerr, 1983). The decline in school enrollments, the loss in the salaries of teachers due to inflation, and the internal turmoil of schooling (desegregation, teacher strikes, school violence, etc.) have seriously eroded the attractiveness of the once honorable profession. One response to this recurring dilemma has been the implementation of job incentive strategies to make teaching a more attractive profession. However, these attempts have oversimplified the problem by assuming that monetary incentives have the same value for all teachers in the system. The focus of this presentation is to develop an analytical framework which addresses the underlying psychological basis of monetary incentives for teachers with particular attention given to the history of incentive strategies utilized in improving performance on the job.

Bernard Oliver
Department of Health and Physical Education
Syracuse University
Syracuse, NY 13244

COLLABORATION FOR INSTRUCTIONAL IMPROVEMENT: MODELS FOR SCHOOL-UNIVERSITY PARTNERSHIPS

The purpose of this symposium is to describe several collaborative models that have been used in physical education to improve instruction. These will provide some guidelines and initial impetus for others to begin building stronger working relationships between institutions of higher learning and public schools through unified planning and teaching.

Models for Collaboration. Thomas J. Martinek, University of North Carolina, Greensboro.

In this paper special attention will be given to the description of two types of collaborative models: program assistance and research bonded. Discussion will center on specific principles of successful collaboration common to both types of models. Further discussion will describe the features/considerations that are unique to both groups of models. This paper will also serve as the introduction to the remaining parts of the symposium,

Thomas J. Martinek
Department of Physical Education
University of North Carolina
Greensboro, North Carolina 27412

Thursday, April 16
3:45-5:30 p.m.

Collaboration in Physical Education: Are We Building or Burning our Bridges? George Graham, Virginia Polytechnic and State University.

This section will focus on what our profession has and has not done about the development of collaborative models for instructional improvement. This paper will also address the importance of collaborative work on both inservice and preservice programming. It will also draw attention to those principles needed for successful bridge building between teacher educators in the universities and public school teachers, administrators and the parent community. The implications of recent movements toward educational reform will be discussed in light of developing strong partnerships between institutions of higher learning and the public schools.

Program Assistance Models. Pat Griffin, University of Massachusetts

This part will include a paper by Pat Griffin who will describe the "Second Wind" program that is being conducted at the University of Massachusetts. A unique relationship has been established where the university serves to provide teachers with information about effective teaching and the support services for facilitating the planning and teaching of physical education. Components of the program relative to planning and implementation will be discussed. Special attention will be given to presenting specific guidelines for those who wish to establish similar programs operating under this model.

Research Bonded Models. Paul Schempp, University of Oregon

Specific strategies for generating research findings from collaborative partnerships will be presented in this paper. Criteria will be suggested for evaluating the potency of collaborative research along with specific studies recently completed in physical education. In addition specific ways to encourage teachers to become an integral part of the research process will be presented. The notion of the teacher as the researcher will be introduced. Discussion will center on portions of ongoing work by Schempp who is working with teachers who instruct from varying perspectives.

Support Systems for Successful Collaboration. Thomas J. Martinek University of North Carolina at Greensboro and Fran Nolan, Greensboro City Schools, Greensboro, North Carolina

No matter what type of collaborative model one choses, the success of a project will depend greatly on the amount and type of support there is to conduct it. The final part of the symposium will provide some thoughts on what is needed to make changes in the philosophical foundations of the university and public school systems for successful collaboration to flourish. Martinek will propose specific changes that need to occur at the university level. Nolan will discuss the types of support systems that exist as well as those needed within the public school system to support healthy and productive partnerships.

COMPARATIVE LEISURE AND RECREATION

Typically two methodological tools are used in the attempts to understand leisure behavior on a universal basis. This symposium is designed to present studies using these two methods: time-budget technique, and case study approach. Leisure behavior of samples from the societies listed, along with the leisure delivery systems, will be discussed. The dynamics of politics, bureaucracy and centralization, with their impact on leisure behavior and the delivery systems, will be reacted to by the discussants.

The Secularization of Leisure in Israel. Joseph Levy, York University.

What is the impact of modern practices on ancient values? The amount of leisure time in Israeli society has grown steadily due to longer vacations, retirement policies, and national holidays. Presently, the work week in Israel is 5-1/2 days. The five-day work week is desired by most Israelis; however, it is still not clear where the extra half day will come from. This presentation will concentrate on the secularization of leisure in Israel, and the services that will be most affected by the change from a 5-1/2 to a 5-day work week. The Israeli society is unique in that it evolved through a number of wars and a continuing external threat has created a state of anxiety and tension. Leisure offers an opportunity for tension release, self expresion and improved overall quality of life. Israel is also a pluralistic society, marked with a plethora of different ethnic, racial and religious groups. Leisure services have become tools for integrating, socializing and educating the various and diverse cultural groups making up the society.

Hilmi Ibrahim
Whittier College
Whittier, CA 90608

Friday, April 17
9:00-10:15 a.m.

Leisure and Recreation in Egypt. Malak Abou Hargah, Southern University.

Summaries of 3 recent studies on leisure and recreation in that developing country will be presented. The first study which utilized a time-budget tool previously applied to samples from 12 eastern and western bloc nations showed that urbanized Egyptians have as much free time as other nations with television watching ranking at the top of the most participated-in recreational activities. The second study of the administrative set-up showed high centralization and bureaucracy with an emphasis on providing organized sport. The third study on Islam revealed that it encourages participation in recreational activities and provides for special occasions. It seems that there is a strong tendency among urbanized Egyptians to participate in the same type of recreational activities as in industrial nations. With urbanization increasing, such a trend will continue. On the other hand, Islamic traditions will continue to be a strong factor in the selectivity of these activities.

Motivation Discrepency and Recreational Leadership: A Cross-Cultural Comparison. Larry L. Neal, University of Oregon.

This presentation summarizes a seven-year effort to discover the area of superior-subordinate relationship and the resulting motivation. Ten countries as well as Puerto Rico were covered over the seven years. Recreation leaders from Aruba, Australia, Canada, Colombia, Costa Rica, Dominican Republic, Hondorus, Panama, Venezuela and the United States (California and Oregon) reacted to a modified Q-sort instrument. The samples of these nationals varied from 40 to 300. The findings show universal positive results in the leisure services field when compared to other contemporary management trends in superior-subordinate relationship and the resulting motivation. Positive results were also found among both public agency personnel and private agency leaders.

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Leisure and Recreation in Costa Rica. Michael Blazey, Washington State University.

The purpose of this presentation is to give a historical and cultural background of Costa Rica and the rise of modern recreational services there. Costa Rica, which means literally the rich coast, takes great pride in its achievements, particularly when compared to other Central American countries. Like their racial background, Costa Ricans are relatively homogeneous. A basic Spanish Catholic pattern is reflected in the picturesque folklore of the *retreta* which takes place in the central square of the town during the yearly round of festivals such as the Holy Week procession. There games of chance and lottery are popular. Recently organized recreational opportunity has led to an increased interest in soccer among young city dwellers. Bull-baiting continues to be popular among rural residents and leisure services are taking it into consideration. Despite the encroachment of new recreational activities that are imported, native activities will continue to be popular.

Leisure and Recreation in Norway. E. A. Scholer, University of New Mexico.

Are the recreational services in a welfare society efficient? The Government of Norway, a social welfare state, has long assumed a distinct as well as a primary role in providing leisure services to the public. Programs are coordinated through central agencies that provide a basis of support both through funding and planning services. Funding and technical assistance filters down to local governmental sub-divisions for planning, research, and limited aspects of program development. In essence the role of the central government has been similar to that of the dismantled U.S. Bureau of Outdoor Recreation, although the Norwegian Agencies were in operation many years before the United States created its first federal agency with specific responsibility for such services.

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BASIC AND APPLIED RESEARCH IN PHYSICAL EDUCATION: A GENERAL FRAMEWORK WITH AN EXAMPLE FROM MOTOR LEARNING

A current issue in physical education is the relative contributions of basic and applied research. Unfortunately, the relation between basic and applied research is often misunderstood. The purpose of this symposium is to provide a general framework for research in physical education. Three levels of research from the most basic to the most applied are identified and their interrelations are discussed. An example is drawn from motor learning that illustrates how research at each level can examine a common theoretical issue.

A Framework for Basic and Applied Research: Cooperating Levels of Inquiry. Robert W. Christina, Pennsylvania State University.

Three levels from the most basic to the most applied research on motor learning, divided according to their relevance for providing solutions to practical problems, are examined in relation to the current view that has guided our research efforts for the past 15 years. This view holds that applied research is an extension of the basic research, it is subordinate to and predominantly dependent on basic research with little if any potential to contribute to basic research. Allowing this view to guide our motor learning research efforts we have suppressed applied research and isolated it and basic research from each other. It is argued that the time has come to adopt an alternative view to guide our future research efforts. The view recommended is presented as a general framework for physical education researach in which basic and applied research are seen as independent but cooperating endeavors that have the potential to contribute to each other.

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Friday, April 17
10:45-12:00 noon

Investigating Contextual Interference Effect: Basic Research (Level 1).

Daniel J. Weeks, Auburn University.

The present paper seeks to apply and extend the "forgetting hypothesis" forwarded by Lee and Magill (1985) as a theoretical basis for the contextual interference effect in motor skill acquisition. A synthesis of previous empirical research arising from both the verbal and motor domains will be presented, and some data recently collected will be introduced to support the hypothesis. The contribution of this basic level of research is two-fold. First, it produces extension and re-evaluation of current theoretical models of motor learning. Second, it provides clear and direct testable hypotheses that can be extended to a number of basic and applied settings.

Investigating Contextual Interference Effect: Applied Research (Level 2).

Richard Magill, Louisiana State University and Sinah Goode, Ball State University.

The purpose of this presentation is to describe two experiments that exemplify research activity at Level 2 of applied research. At this level, the goal is to develop theory-based knowledge appropriate for understanding the learning of practical skills in practical settings with no requirement to find immediate solutions to practical learning problems. The first experiment shows the benefit of random over blocked practice schedules for learning three badminton serves by beginning badminton students. The second experiment addresses the need to establish parameters for the extent of the application possible for the contextual interference effect. Results suggest some limits to the degree of application of the contextual interference effect. These experiments illustrate that laboratory, basic level 1 research can be extended to more practical situations with the principle derived from that basic research being supported.

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Investigating Contextual Interference Effect: Applied Research (Level 3). William S. Husak and Constance M. Sears, California State University-Long Beach.

Christina has advocated a three-level systematic approach for research in motor learning and control. The third level of this approach is deemed to have the most relevance for the practitioner. The focus of research at this level is to use theory to find solutions to learning problems in practical settings. The purpose of this presentation is to offer suggestions how contextual interference effects may be applied by the teacher and coach. Data from an applied educational setting, the teaching of a volleyball skill to middle school students, will be presented. The efficacy of Christina's three-level approach to conducting research will be discussed from the practitioner's perspective.

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HOMOPHOBIA AND HOMOSEXUALITY IN SPORT AND PHYSICAL EDUCATION: ISSUES IN CONDUCTING CONTROVERSIAL RESEARCH

The purpose of the symposium is to explore issues involved in conducting research on homophobia and homosexuality in sport and physical education. A description of recent research on homophobia and homosexuality in education in general and physical education and sport in particular will form the basis for a discussion of specific isuses encountered in conducting controversial research. These issues include identification of researcher ideology, ethical considerations in protecting participants' identities, researcher-participant relationships, and methodological choices. Then a discussion of the political implications will consider individual, institutional and societal dimensions of research on homophobia in sport and physical education.

A Description of the Research Base: Homophobia and Homosexuality in Education, Physical Education and Sport. Jim Genasci, Springfield College.

The purpose of this part of the symposium is to present a survey of research on homosexuality or homophobia in education, physical education and sport, and to highlight similarities and differences in purpose, subjects, method, results, and researcher interpretations among these studies. This discussion will form the basis for subsequent consideration of issues in conducting research on controversial topics. One of the conclusions to be drawn is that there is little research available in this area; perhaps as a reflection of the controversial nature of the topic. If researchers are to be encouraged to study controversial topics, an examination of some issues involved in this kind of research will be useful.

Patricia S. Griffin
106 Totman Building
University of Massachusetts
Amherst, MA 01003

Friday, April 17
1:00-2:15 p.m.

Homophobes, Gay Activists and The Myth of Researcher Objectivity.

Pat Griffin, University of Massachusetts.

The purpose of this presentation is to discuss the importance of identifying researcher ideology, particularly when investigating controversial social issues. Ideology is defined as the particular set of beliefs that guide a researcher's actions and attitudes. Researcher ideology specifically related to research on homophobia and homosexuality in sport and physical education will be examined as a special case in which the ignorance, anger, fear and stigma associated with homosexuality are integral parts of the research process and must be accounted for.

Studying the Experience of Lesbian Physical Education Teachers: A Descriptive Analysis of the Process.

Sherry Woods, University of Massachusetts.

Using a study of lesbian physical education teachers as a backdrop, this presentation will examine issues that arise during the process of conducting such research. A brief overview of the study will precede this discussion. Five process concerns will be addressed: 1) gaining access to participants, 2) protecting participant anonymity, 3) designing a consent form, 4) working for equity in the participant/researcher relationship, and 5) addressing ethical issues. The conclusions to be drawn will focus on the responsibility of the researcher to address these issues.

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Opening the Closet Door: Some Political Implications of Doing Controversial Research. Don Sabo, D'Youville College.

The purpose of this presentation is to discuss political implications of conducting research on homophobia and homosexuality in sport and physical education. Using a multidimensional perspective, the presenter will consider personal, institutional, professional and societal implications. Conclusions include the assertion that research on homophobia and homosexuality in sport and physical education is an important, rich, and largely unexplored area. Through the use of sensitive and careful research strategies, there is an opportunity to improve our knowledge and understanding of a controversial topic in the context of physical education and sport.

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DEVELOPING BETTER YOUTH SPORT COACHES: AN EVALUATION OF THE ACEP COACHING EDUCATION PROGRAM

Recently several coaching education programs have been developed to enhance the effectiveness of youth sport coaches, but to date, none has been systematically evaluated. The purpose of this symposium is to present the results of an investigation evaluating the effectiveness of the American Coaching Effectiveness Program (ACEP) Level 1 coaching education program. In the symposium, the four speakers will provide an overview of the development of the ACEP Level 1 curriculum, identify the evaluation model and research design used in this investigation, describe the development of a new behavioral observation instrument for youth basketball, evaluate the impact of ACEP training on sport science knowledge and coaches' attitudes, assess the impact of ACEP training on coaching behaviors and players' attitudes and competitive cognitions and, finally, discuss future directions for ACEP.

The American Coaching Effectiveness Program: The First Five Years. Dan Gould, University of Illinois.

The American Coaching Effectiveness Program (ACEP) officially began in the spring of 1982 with the publication of the ACEP Instructor Guide, ACEP course materials and the text, Coaching Young Athletes. Since its inception, over 35,000 coaches representing a wide variety of sports have participated in the program. ACEP is designed to improve the effectiveness of coaches by helping them to develop a coaching philosophy that emphasizes "athletes first, winning 2nd," by aiding coaches in understanding the basis of sports medicine and science, by assisting coaches in teaching skills, tactics and rules of their sport and by motivating the coaches to improve their coaching skills and knowledge. Topics discussed include: a course introduction, developing a coaching philosophy, sport psychology, sport pedagogy, sport physiology, sport medicine and sport-specific information. Information in these areas is conveyed to the coaches through an active-learning format that involves lectures, video tapes, group exercises and discussions. Over the last 5 years, feedback from both coaches and clinic instructors has been used to guide program revisions.

Damon Burton
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University of Idaho
Moscow, Idaho 83843

Friday, April 17
2:30-4:15 p.m.

ACEP Evaluation Model and Study Design. Damon Burton, University of Idaho.

In order to evaluate the ACEP Level 1 coaching education program, a cognitive evaluation model was developed based on Smith, Smoll and Curtis' (1978) previous research. The ACEP evaluation model hypothesized that (a) training should initially elicit cognitive and affective changes in coaches, particularly in their knowledge of and attitudes toward appropriate coaching philosophies and effective coaching behaviors, (b) cognitive and affective change should then interact with perceptions of current coaching behaviors to elicit changes in actual coaching behaviors, and (c) changes in actual coaching behaviors should prompt changes in players' attitudes and competitive cognitions. To assess model variables, the study employed a pretest-posttest design in which ACEP and non-ACEP coaches and their players completed pre- and post-season questionnaires designed to evaluate differences on key attitudes and cognitions, whereas the coaching behaviors of both groups were assessed through behavioral observation of both early and late-season practices and games.

Development of the Coaching Behavior Observational Recording System (CBORS). Deborah Tannehill, University of Idaho.

Current behavior observational instruments have proved ineffective at measuring coaching behaviors in fast-paced, highly interactive sports such as basketball. Therefore, Tannehill and Burton (in press) developed the Coaching Behavior Observational Recording System (CBORS) for this purpose. CBORS measures 4 coaching "climates," specifying how practice time is spent (e.g., instruction versus management), 4 coaching "interactions" who is being coached (e.g., individual versus team), and 21 coaching "behaviors" (e.g., positive modeling). CBORS employs a time sampling method of behavioral observation in which observers have 5 seconds to observe behavior and then 5 seconds to record the predominant climate, interaction and behavior. Observers then alternate 3-minute behavioral sampling and rest periods for an entire practice or game. A training manual and videotape were developed to teach CBORS categories. Results revealed CBORS could effectively measure these behavioral categories in basketball, and interobserver reliability exceeded 90% for each of CBORS three subscales.

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Evaluation of ACEP Training on Sport Science Knowledge and Coaches' Attitudes.

Damon Burton, University of Idaho.

The first step in effectively changing coaching behaviors is to increase coaches' knowledge of appropriate coaching philosophies and behaviors and then to help coaches develop positive attitudes about developing similar philosophies and behaviors. In this investigation, the cognitive and affective impact of ACEP training was assessed by having 12 ACEP-trained and 12 non-trained youth basketball coaches complete questionnaires assessing their knowledge of and attitudes toward appropriate coaching philosophies, coaching behaviors and sport science techniques prior to training. Following conclusion of the season, coaches' knowledge and attitudes were again assessed, as well as how much training had changed these cognitive and affective variables. Results revealed that ACEP and non-ACEP coaches did not differ in pretraining knowledge and attitudes, but following training, ACEP coaches demonstrated significantly greater sport science knowledge and more positive attitudes toward key coaching philosophies and behaviors than non-ACEP coaches. Moreover, ACEP training was generally endorsed as a significant contributor to these positive cognitive and affective changes.

Evaluation of ACEP Training on Coaching Behaviors and Players' Attitudes and Competitive Cognitions.

Deborah Tannehill, University of Idaho.

The challenge for coaching education programs is to change how coaches coach. Behavioral change normally occurs only when accurate knowledge of and positive attitudes toward new coaching behaviors are coupled with accurate perceptions of current behavior. Moreover, skilled coaches should then foster positive player attitudes and competitive cognitions. In order to assess these model predictions, perceived coaching behaviors of ACEP and non-ACEP coaches and their players were compared to actual coaching behaviors. Results revealed that players' perceptions of their coaches' behaviors were significantly more accurate than the coach's own. ACEP and non-ACEP players and coaches did not differ on accuracy of perceived coaching behaviors, but results comparing actual coaching behaviors for ACEP and non-ACEP coaches and players' postseason attitudes and competitive cognitions were both either nonsignificant or contrary to hypothesized predictions. In conclusion, the brief ACEP Level 1 intervention program appears effective at eliciting cognitive and affective but not behavioral changes among youth coaches.

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Future Directions for ACEP. Rainer Martens, University of Illinois.

The most significant challenge for ACEP in the immediate future is developing and maintaining a system for implementing the Level 1 and 2 curricula which are now developed. To accomplish this goal the ACEP staff is developing a variety of implementation systems, including a network of universities who offer ACEP courses, a public school system, and systems to meet the unique needs of major sport organizations. ACEP's aspirations are to use interactive video instructional programs, a newsletter called American Coach, and cable television for the continuing education of coaches. ACEP also will develop a Level 3 sport science curriculum, a Level 1 recertification program, and complete the Level 1 and 2 sport-specific series. The synthesis of research into meaningful knowledge for coaches will be an on-going process for keeping all curricula updated. ACEP also hopes to be able to sponsor research and support a national resource center for coaching education and children's sports.

Damon Burton
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EFFECTS OF EXERCISE INTENSITY ON RECOVERY METABOLISM AND THERMOREGULATION. J.M. Pivarnik, University of Houston; J.E. Wilkerson, University of Miami School of Medicine.

The purpose of the study was to examine the post-exercise metabolic and thermoregulatory indices following three endurance exercise sessions of different intensity (WL1, WL2, WL3). Six endurance trained ($\dot{V}O2$ max = 64.6±7.0 ml·kg-1·min-1) and heat acclimatized adult male volunteers walked or ran on a motorized treadmill for one hour (or until exhaustion) on three separate occasions. Oxygen consumptions ($\dot{V}O2$) averaged 1.7 l·min-1 in WL1, 2.6 l·min-1 in WL2, and 3.5 l·min-1 in WL3. Experimental protocols were randomized among subjects. Ambient temperature averaged 23°C (rh=74%). A 90 minute seated rest proceeded, and a 60 minute seated recovery followed each exercise session. $\dot{V}O2$, heart rates (HR), rectal (Tre) and skin (Tsk) temperatures were monitored continuously during the entire experimental session. Recovery $\dot{V}O2$'s returned to pre-exercise levels (0.3 l·min-1) by 10 minutes in WL1 and WL2 and by 20 minutes in WL3. Excess post-exercise oxygen consumption (EPOC) totaled 1.8 l in WL1, 3.1 l in WL2, and 6.8 l in WL3. After 60 minutes of recovery, HR's remained elevated over pre-exercise values (62 b·min-1) in all conditions (WL1=77, WL2=82, and WL3=92 b·min-1). Although Tre's declined after exercise, they had not dropped to resting levels after 60 minutes of recovery. Tsk's dropped below resting values by the end of recovery in all experimental conditions. The elevated core temperature was quite likely associated with the continuation of post-exercise evaporative heat loss, which increased as a function of exercise intensity. Body weight losses indicated that recovery sweat rates following WL1, WL2, and WL3 were 4, 5, and 7 g·min-1, respectively. In the present investigation, it appears that elevated post-exercise HR's were associated with thermoregulatory, as opposed to metabolic demands.

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Tuesday, April 14
9:00-9:15 a.m.

METABOLIC AND HEART RATE RESPONSES TO AQUATIC EXERCISE

Bob L. Beasley, University of South Florida

The purpose of this study was to evaluate the acute metabolic and heart rate responses to an aquatic circuit training (ACT) program that was similar in design to traditional land-based circuit weight training (CWT) programs. Although it is generally accepted that swimming is an effective mode of exercise for developing and maintaining aerobic fitness, it is less clear that other popular forms of aquatic exercise such as calisthenics, running in water and simulated weight training exercises, using hand-held paddles, and performed in a circuit training format are similarly effective aerobic activities. Oxygen uptake ($\dot{V}O_2$), energy expenditure (kcal), and heart rate (HR) were monitored in six, aerobically fit (mean $\dot{V}O_2$ max = 54 ml kg-1 min-1), young adult males during three structured ACT water exercise routines. The routines varied in lengths of 21 minutes (short), 36 minutes (medium), and 46 minutes (long). The exercises, performed consecutively and non-stop in waist to neck-deep water (28°C), included stretching, calisthenics, running, bobbing, and upper body paddle (high resistive) exercises. Open circuit spirometry was used to measure $\dot{V}O_2$, with continuous minute-by-minute samples of expired air analyzed for percentages of oxygen and carbon dioxide. HR was also determined each minute from telemetered ECG recordings. The authors evaluated the ACT routines in terms of the American College of Sports Medicine (ACSM) recommendations for intensity (60% to 90% HR max reserve and 50% to 85% $\dot{V}O_2$ max) for developing and maintaining cardiovascular fitness. The values for percent of HR max for the subjects during the three routines were maintained within, but at the lower end of, recommended ranges at 69%, 73%, and 68% HR max, and the percent of $\dot{V}O_2$ max values were also maintained within, but at the lower end of the recommended ranges at 56%, 63%, and 54% $\dot{V}O_2$ max for the short, medium, and long routines respectively. Total net energy expenditure was 181 kcal, 347 kcal, and 376 kcal for the short, medium and long routines, respectively, resulting in an average caloric expenditure of 9 kcal per minute for the three routines. The authors concluded that the ACT routines elicited metabolic and heart rate responses that compared favorably with those reported for land-based CWT programs, and minimally met the ACSM recommendations for intensity for developing and maintaining aerobic capacity in the study subjects. However, the ACT routines could provide the proper aerobic training intensity for people with average or below average aerobic work capacity.

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Tuesday, April 14
9:15-9:30 a.m.

THE PHYSIOLOGICAL EFFECTS OF WEARING POLYPROPYLENE GARMENTS IN WARM WEATHER

Douglas Allen and Karla G. McDougal
Human Performance Laboratory, Oregon Health Sciences University

The purpose of this study was to analyze the effects of wearing polypropylene (PP) garments during steady-state exercise in warm weather. Eight healthy, well-trained males, ($\bar{X}$age= 31.9yrs) volunteered for this acute study. Subjects initially underwent an incremental test to exhaustion on a programmable bicycle ergometer to determine max oxygen uptake (VO_2 max) and max workload. Each subject then performed two 90 min rides at 50% of max workload with ambient, diurnal and hydration states standardized. Ambient conditions were maintained at 22.8°C (73.0°F) and 54% humidity. Subjects reported for testing in the post-absorptive state with a minimum 72 hr rest between tests. Subjects performed one "nude" 90 min ride wearing only a small athletic brief. The other 90 min ride was conducted with the subjects wearing a long-sleeved PP top, PP tights, and the athletic brief. Testing sequence was randomized. Tights and tops were made by Sportco and were composed of 90% filament PP ($10\frac{1}{4}$ oz per linear yd) and 10% lycra. Throughout each 90 min ride, HR, $\dot{V}O_2$ and $\dot{V}E$ were recorded every 20 sec, while core temp, skin temp, blood pressure (BP) and double product (DP) were recorded every 60 sec. Data was analyzed by ANOVA using a one-way repeated measures design with significance set at $p<.05$.

Parameter	NUDE ($\bar{X}$±SEM)	PP ($\bar{X}$±SEM)
Fluid Loss (lbs)	4.01 ± 0.28	4.71 ± 0.32*
Rectal Temp (°C)	38.2 ± 0.09	38.1 ± 0.13
Torso Skin Temp (°C)	35.7 ± 0.53	36.7 ± 0.21*
Arm Skin Temp (°C)	36.4 ± 0.18	36.3 ± 0.27
Leg Skin Temp (°C)	34.8 ± 0.66	35.0 ± 0.39
$\dot{V}O_2$ (ml/kg/min)	32.0 ± 0.98	32.7 ± 1.20
$\dot{V}E$ (L/min)	62.2 ± 2.45	62.1 ± 2.08
HR (beats/min)	137.7 ± 6.29	142.3 ± 6.15
SBP (mmHg)	144.2 ± 5.35	143.9 ± 6.18
DBP (mmHg)	60.0 ± 2.42	58.5 ± 1.84
DP	19,724 ± 766	20,766 ± 1252

Although fluid loss and torso skin temp were significantly greater when subjects wore the PP garments, core temp, $\dot{V}O_2$, $\dot{V}E$, HR, BP and DP showed no significant interride differences. These results demonstrate that although PP garments caused greater fluid loss, the physiological parameters most indicative of compromised performance (i.e., $\dot{V}O_2$, DP, and core temp) showed no significant differences. In conclusion, this study suggests that wearing skin-tight PP garments in warm weather will not limit performance during steady-state exercise of up to 90 min duration.

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Tuesday, April 14
9:30-9:45 a.m.

THE EFFECTS OF A LOW INTENSITY AND HIGH INTENSITY TRAINING PROGRAM UPON BODY WEIGHT, FAT CELL MEASUREMENTS AND PERCENT CARCASS FAT IN THE MALE RAT. Christopher L. Schottel, University of Southern California, Robert N. Girandola, University of Southern California.

The purpose of this study was to determine the effects of a low intensity (LI) and a high intensity (HI) ten week training program upon body weight, fat cell measurements and percent carcass fat in male rats. Based upon running ability, seven week old Sprague Dawley rats were assigned to one of the following groups: a) HI training group- 40 m/min, 8% mill grade, 30 min/day, 6 days/wk, for 10 wks, b) LI training group- 20 m/min, 8% mill grade, 60 min/day, 6 days/wk, for 10 wks, c) sedentary pair-weighted (PW) group, and d) sedentary ad libitum feed (AL) group. Both the PW group and the LI group were pair-weighted to the HI group. Fat cell measurements were obtained by the osmium fixation method and cells were counted using a coulter counter. Samples of homogenized rat carcass were freeze dried to determine water content. Lipid content in fat pad samples and rat carcass was determined using the folch method of lipid extraction. Two way analysis of variance was used to determine significant mean differences between groups. The Newman-Keuls post hoc test was used for all significant F values. The HI, LI, and PW groups were significantly lower in the average: a) body weight, b) carcass weight, c) epididymal fat cell size, and d) retroperitoneal fat pad weight when compared to the AL group. The two exercise groups were significantly lower in all of the parameters measured in the study when compared to the AL group. The HI group was significantly lower in percent carcass fat when compared to both sedentary groups. The LI group was significantly lower in percent carcass fat when compared to the PW group. There was no significant difference between the HI group and LI group in any of the parameters measured in the study.

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Tuesday, April 14
9:45-10:00 a.m.

ACCURACY OF PREDICTED MAXIMAL HEART RATE. Hermann J. Engels, Robert J. Moffatt, Richard L. Tate, The Florida State University.

The purpose of this study was to examine the accuracy of the standard age adjusted prediction equation (HR_{max} = 220 - age). A total of 383 volunteers completed a graded treadmill test using a modified Bruce Protocol to determine VO_{2max} and HR_{max}. Oxygen uptake was determined by open circuit spirometry methods using the Beckman Metabolic Measuring Cart. Heart rate was recorded electrocardiographically throughout each treadmill test. Maximal heart rate was taken as the highest heart rate achieved, which usually occurred during the last minute of exercise. Analysis of data was limited to 223 subjects ($\bar{x}$ age = 36.1 ± 7.4) who satisfied criteria for attainment of VO_{2max} as established by Taylor et al (1955). Actual HR_{max} (AHR_{max}) was compared with age predicted HR_{max} (PHR_{max}). The correlation between AHR_{max} and PHR_{max} was $r = .63$. Linear regression was used to generate an equation for HR_{max} on age (PHR_{max} = 213.2 - .658A) to fit the current data. Comparison of regression slopes indicate that the standard equation (220 - age) consistently underpredicts HR_{max} ($p< 0.05$) and that the ability to accurately predict decreases with age. Heart rate results were as follows:

AGE		20-29	30-39	40-49	50-59	60-64
N		78	73	43	14	15
PHR_{max}	$\bar{x}$	195.2±	185.1±	176.7±	164.8±	157.9±
	SD	2.85	2.96	2.80	3.14	1.68
AHR_{max}	$\bar{x}$	196.7±	190.8±	185.2±	174.9±	172.7±
	SD	8.53	8.44	8.39	13.24	12.83

The results of this study suggest that the equation HR_{max} = 220 - age does not accurately estimate HR_{max} with age for the population examined.

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Tuesday, April 14
10:00-10:15 a.m.

LEISURE SATISFACTION AND PARTICIPATION: THEIR RELATIONSHIP WITH AN EATING DISORDER. John T. Hultsman, Purdue University; Jane E. Kaufman, Purdue University; Leslie G. McBride, Portland State University.

This study examined the possible linkage between leisure and health by investigating a particular health dysfunction - bulimia nervosa - relative to leisure participation and satisfaction. Specifically, the purposes of the study were: a.) to determine if it is possible, on the basis of knowledge about leisure participation, leisure satisfaction, perceptions of quality of life, and personal attributes, to distinguish between persons exhibiting bulimic symptomatology and non-bulimics; and b.) if significant differences between such groups exist, to delineate what aspects of leisure and personal characteristics are important in establishing these differences. A questionnaire was administered to individuals in each of two subsamples, one of which was comprised of persons diagnosed as bulimic (n=33) with the other (n=326) being a control group drawn from students enrolled in a midwestern university. The questionnaire included the Bulimia Test (BULIT), a Leisure Participation Instrument (LPI), the Leisure Satisfaction Scale (LSS), a measure of quality of life (QOL), and questions about personal attributes of subjects. Discriminant analysis was used to distinguish bulimics from non-bulimics on the basis of their scores on the subscales of the instruments cited above. The results were significant ($p<.0000$), while interpretation of the adjusted squared canonical correlation (.347), Wilk's Lambda (.623), and a proportional reduction in error statistic (tau) of .670 all suggested a moderate ability of the discriminant function to distinguish between the two groups. Both the structure coefficients and the standardized discriminant coefficients indicated that positive affect, the psychological benefits subscale of the LSS, and age were the most salient predictors of group differences. The results of this study have implications for using information about leisure habits and attributes both for identifying potential bulimics and treating the dysfunction through therapeutic strategies including leisure counseling.

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Tuesday, April 14
10:45-11:00 a.m.

RELIABILITY OF THE COMPREHENSIVE LEISURE RATING SCALE.

Jaclyn A. Card, University of Missouri-Columbia.

The purpose of this study was to test interrater reliability of the Comprehensive Leisure Rating Scale (CLEIRS). CLEIRS was developed to measure the degree of independence in leisure of aged, mentally ill residents residing in nursing and boarding homes. Initial test results (Card, Compton, & Ellis, 1986) indicated that CLEIRS was reliable and valid but further testing was recommended. Five scales were included in the original version of CLEIRS. The Personal Management Skills scale was eliminated in the present study because it produced the lowest alpha reliability of the five scales. The revised version of CLEIRS was completed by a registered nurse and a licensed practical nurse for six residents in a skilled nursing home facility. CLEIRS was completed on the six residents prior to the implementation of a recreation program, during the recreation program, and following the recreation program. Testing occurred over a six month period. Three males and three females ranging in age from 68 to 82 years of age were assessed. Years institutionalized ranged from one to 47. Results indicated that residents' degree of independence increased or remained the same from one testing to the next. The licensed practical nurse appeared to have a better indication of the residents degree of independence in leisure indicating that CLEIRS must be completed by a staff member that is well versed in the residents' leisure behavior.

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Tuesday, April 14
11:00-11:15 a.m.

SENSATION SEEKING AMONG FEMALES WHO PARTICIPATE IN HIGH- AND LOW-RISK LEISURE ACTIVITIES.

Jim Stiehl, University of Colorado; Patrick T. Long, University of Colorado; Zung V. Tran, Arizona State University; Elizabeth Green, University of Colorado

Many popular leisure activities can provide thrills and adventure, particularly high-risk sports such as rock climbing and hang gliding. Although risk as it relates to leisure activities is a potentially powerful concept (Cheron & Ritchie, 1982), little is known about why people, particularly women, become involved in high-risk activities. Unfortunately, there is a dearth of valid and reliable instruments to assess participants' many and diverse behaviors. One instrument that has shown promise, however, is Zuckerman's Sensation Seeking Scale (SSS) developed to distinguish high from low sensation seekers, the former having more adventurous tastes. The purpose of this study was to determine the validity of Zuckerman's SSS using high- and low-risk leisure sport enthusiasts. In a previous study by Straub (1982), male participants in high-risk activities scored significantly higher on the SSS than did low-risk participants. Yet, in a related study using females, no similar differences were observed. In the latter study, however, there is question as to whether the activities that were investigated can be classified as high risk; and in both studies a potentially confounding age factor required correction. In the present study, the SSS (Form V) was administered to female speed skiers, hang gliders, and 3-day equestriennes (all high risk), as well as bowlers, swimmers, and tennis players (all low risk). It was hypothesized that the high-risk participants would score significantly lower ($p < .05$) than the low-risk participants in total sensation-seeking score and on the four subscales of Zuckerman's test. Multivariate ANOVA procedures for a 6 X 2 design (activity X sensation seeking) were used to analyze the data. A stepwise multiple discriminant function analysis was used to test the primary and secondary research hypotheses. Stepwise procedures were used due to our interest in determining the order in which the four subscales might contribute to the discrimination between high- and low-risk groups. In contrast to Straub's study of female participants, these results provide, in general, strong support for the validity of Zuckerman's SSS. As hypothesized, females participating in high-risk sports scored significantly higher in total sensation-seeking than did low-risk participants. However, female scores on the subscales were surprisingly different from those of males. Outcomes of this study may be explained partly in light of the corrections made for the confounding age factor, and partly on the basis of female/male differences.

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Tuesday, April 14
11:15-11:30 a.m.

MARKETING OUTDOOR ADVENTURE PROGRAMS: BENEFIT SEGMENTATION OF OUTDOOR LEADERSHIP COURSES. Scott Shafer and Daniel R. Williams, University of Utah.

The purpose of this study is to identify target market segments of commercial outdoor adventure programs. The benefits perceived by the participants of the program were used as the segmenting criteria. Subjects included 130 participants in outdoor courses offered by the National Outdoor Leadership School (NOLS). The types of courses included wilderness, mountaineering, and outdoor education. Each subject completed a post course questionnaire which asked them to rate the extent to which they received a number of psychological benefits. From Driver's (1977) item pool, six benefit scales were measured: discovering nature, social contact, escaping physical pressure, achievement, escaping society, and leadership/autonomy. Each NOLS participant was given a score, based on their responses to the various items, that made up each of these benefit scales. To develop market segments, subject profiles on the six benefit scales were cluster analyzed. Six benefit segments were identified and labeled. Agreeable enthusiasts (20%) scored high on all benefits, escapists (14%) rated escape as the most important benefit, socializers (15%) emphasized social contact, apathetics (5%) rated all benefits low, achievers (22%) emphasized achievement and leadership/autonomy, and NOLS normals (25%) rated all the benefits close to the mean. Subjects in each cluster were also compared on course type, demographic characteristics, and satisfaction scores. Significant differences were observed in gender and satisfaction. These results suggest that two benefit market segments exist that have traditionally not been targeted by NOLS: socializers and escapists.

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Tuesday, April 14
11:30-11:45 a.m.

WHY DON'T STUDENTS PLAY IN INTRAMURALS? M. Deborah Bialeschki, University of North Carolina at Chapel Hill

Understanding why students choose to participate in intramurals is a question common to many campus recreation directors. The purpose of this exploratory research was to analyze intramural participants and non-participants in terms of motivating factors and barriers to participation and demographics. The study was conducted during the Spring of 1986 with a sample of 153 college students from the University of North Carolina-Chapel Hill who were enrolled in one of three introductory Social Science classes. A questionnaire was designed, pilot-tested and administered to ascertain motivating factors and barriers to participation, and demographic characteristics. The initial analysis indicated that 59% of the sample had participated in intramurals during the 1985-1986 academic year. In general, the demographic characteristics of the students who participated in intramural activities were similar to those of the non-participants with only sex of respondent and participation in off-campus recreational activities showing significant difference. Males were more likely to participate in intramurals than were females with 79% of the men indicating participation as compared to a 41% participation rate for women. Intramural participants were also more involved in other off-campus recreational activities. Eighty-one percent of the intramural participants were active in community recreation programs, health clubs, etc. while only 48% of the non-participants in intramurals participated in off-campus recreation. The analysis of variance was used to determine potential differences of participants and non-participants toward motivating factors and barriers to participation in intramurals. The non-participants perceived course work demands, distance from intramural facilities, lack of interest in present programs, lack of skills, and lack of program information as major problems. The participants had a higher level of enjoyment from the activities and were more positive toward competition. The findings from the study have implications for professionals who are programming intramural activities. Since demographics seem to have a minor influence on participation, a focus on methods to decrease barriers related to lack of information, skill development, and lack of opportunities to participate in less competitive situations may be beneficial.

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Tuesday, April 14
11:45-12:00 noon

THE ESTIMATION OF BODY DENSITY IN 50-70 YEAR OLD CAUCASIAN FEMALES.

Barry C. McKeown, Joyce E. Ballard, Sharon L. McCoy, The Universities of Texas at Arlington and Tyler.

Previous research with females has shown that body density estimates can be derived from skinfolds. Jackson et.al. (*Medicine and Science in Sports and Exercise* 12:175-182, 1980) have reported generalized equations for women differing in age and body composition. Included in their sample for estimating body density from skinfold measures were 17 females between the ages of 50-59 years. The purpose of this study, therefore, was to measure body density and subsequently estimate body fatness in 74 postmenopausal caucasian females between the ages of 50 and 70 years and compare the results with the generalized equations. Mean values for the subjects were as follows: age= 58.5 ± 5.8 years; ht= 162.0 ± 5.2 cm; wt= 61.6 ± 9.5 kg; BD= 1.0267 ± 0.0158 gm/cc; BF= 31.0 ± 6.8%; FW= 19.4 ± 6.9 kg and FFW= 41.7 ± 4.8 kg. Six skinfolds were measured with Harpendon calipers with body density determined by hydrostatic weighing. Equations were developed for the estimation of body density with the maximum R^2 regression technique. Comparisons of these equations were made with those of Jackson et.al. The quadratic form of the sum of three, four, and six skinfolds in combination with age produced multiple correlations that ranged from 0.731 to 0.849 with standard errors of .0108 to .0112 gm/cc and 4.6 to 4.8% for body density and percent fat, respectively. While the multiple correlations are lower with higher standard errors than those of Jackson et.al. (R= .842 to .852; SE of .0083 to .0086 gm/cc and 3.8 to 3.9 % BF), recognition is given to their statement that care needs to be exercised when these equations are utilized for women over the age of 40. However, when predicting body fatness from the sum of three skinfolds advocated by Jackson et.al., it was noted that the estimate for this group of 94 females was 2.2% lower than that actually measured but well within the ±3.9% error reported for the original generalized equations. Thus, while caution needs to be taken with body composition equations for females between the ages of 50 and 70 years, these results lend support to the generalized equations of Jackson et.al.

Supported by the University of Texas at Tyler Faculty Research Grant #86.

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Tuesday, April 14
2:00-2:15 p.m.

BODY SEGMENT VOLUMES AND THEIR RELATIONSHIP TO SEGMENTAL BIO-RESISTANCE.

C.Marks, K.Hattori, D.Becque, K.Nau, and V.Katch.
The University of Michigan

The theoretical basis for using body electrical resistance to predict fat free mass involves calculating the volume (V) of the conductor from: $V=K*L^2/RES$, where L^2 is the squared length of the conductor, RES is its resistance, and K is the product of a geometric constant and specific resistivity. No study has validated this theoretical equation for body volumes. Therefore, we investigated the relationship between V and L^2/RES for the whole body and the more regular conductor shapes of the arm, leg, and trunk. Volumes were determined using water displacement. Resistance was measured using the tetrapolar Bio-resistance method and length was measured as the distance between detecting electrodes. Fifty-eight male and female subjects were tested. The mean (±SD) age, body mass (BM), height, and % fat was 25 ± 5.3yrs, 64.74 ± 11.94kg, 169.4 ± 10.3cm, and 19.1 ± 7.4%, respectively. The means (±SD) and correlations (r, ±SEE) between V and L^2/RES are listed below. The slope of the regression line between V and L^2/RES was used to estimate K. The slope and intercept (INT) are also reported.

	ARM	LEG	TRUNK	BODY
V (cm^3)	2200	9570	31250	61740
±SD (cm^3)	480	1750	6810	11400
L^2/RES (cm^2/ohm)	12.3	26.1	47.8	69.3
±SD (cm^2/ohm)	3.4	5.9	12.7	14.3
r (V vs L^2/RES)	0.79	0.63	0.53	0.69
±SEE (cm^3)	294	1360	5756	8260
K (cm*ohm)	111	187	284	550
INT (cm^3)	835	4689	17675	23625

Both V and L^2/RES are strongly related to BM (r= 0.88). When BM is partialled out, the correlatons between V and L^2/RES become 0.41,-0.16,-0.19,and -0.59 for arm, leg, trunk, and whole body, respectively. Thus, we conclude that L^2/RES accounts for little of the variance in volume not accounted for by BM. This raises serious questions about the theoretical basis of using resistance to determine the volume of a segment or of the whole body.

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Tuesday, April 14
2:15-2:30 p.m.

DIFFERENCES OF THE FAT-FREE BODY IN RELATION TO HEIGHT BETWEEN BLACK AND WHITE CHILDREN.

Mary H. Slaughter, University of Illinois: Constance B. Christ, University of Illinois: Timothy G. Lohman, University of Arizona; Richard A. Boileau, University of Illinois.

It has been shown that black children have a greater amount of FFB per unit of height than do white children within the same sex. The purpose of this study was to determine the site and magnitude of those FFB differences by examining the sub-components which comprise the FFB individually. The body composition of 131 white (N = 85) and black (N = 46) males (MW, MB) and 108 white (N = 63) and black (N = 45) females (FW, FB), aged 8 to 18 years, was assessed using a multi-component model. Bone mineral content: bone mineral (BM), bone width (BW), bone density (DB), was measured using photon absorptiometry; total body water (TBW) was determined by a deuterium dilution technique; and body density was measured by hydrostatic weighing, correcting for residual lung volume; and estimates of lean body mass (LBM) were made from total body potassium 40 (40K spectroscopy). The sub-components of the FFB: BM, BW, BD, TBW, and 40K, were regressed on the log of height in order to determine the exponent of the independent variable (HT) which would most accurately predict the dependent variables (BM,BW,BD,TBW,40K), between sex and race. Four regression equations (WM,BM,WF,BF) were derived for each of the variables used to represent a sub-component of the FFB or LBM. Thus, a total of 20 prediction equations were calculated to determine the amount of BM, BW, BD, TBW, and 40K per unit of HT in black and white males and females. The analysis revealed significant ($p < .05$) racial differences in BM and BW, with the MB having a greater amount of bone mineral content, and wider bones, than the MW. Significant racial differences were not observed in 40K, BD, and TBW in the males. However, in females, significant differences were observed in BM and BD, with the FB subjects displaying a greater rate of change with an increase in HT than the FW. Significant racial differences were not demonstrated in the females for 40K, BW, and TBW; however, differences in TBW approached significance ($p < .09$). After puberty, males had higher values for each of the variables, than did females, except for BD. The lower BD values observed in males indicated that the rate in which male bones grew in width was greater than their rate of mineralization. Racial differences were consistent throughout, with blacks having higher values, or greater rates of change, than whites; however, the magnitude of these differences was dependent on sex and on the variable considered.

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Tuesday, April 14
2:30-2:45 p.m.

RELIABILITY ESTIMATES OF MOTOR PERFORMANCE MEASURES IN OLDER ADULTS.

Allen Jackson, Lawrence Bruya and Robert Weinberg, North Texas State University.

Physical educators and exercise scientists are becoming aware of the increasing age of our population and are seeking to measure the physical capabilities of older people. The purpose of the present study was to estimate the reliability (Rxx) of measurements of selected motor performance variables as they might be gathered by researchers who are involved in mass testing and norm development for older populations. The sample of the study included 11 males and 22 females with a mean age of 73.09±6.25. All subjects (Ss) signed informed consents and physicial permissions were also obtained. The Ss were given a battery of motor performance measures including 2 types of reaction time (RT1, RT2), movement time (MT), grip strength of both hands (G1, G2), rotary pursuit (RP), a ring peg task for hand eye coordination (RG), one legged balance for both legs (B1, B2), and hand steadiness with 3 levels of difficulty (H1, H2, H3). All Ss were made familiar with each task and given practice trials. Intraclass correlations were used to estimate the Rxxs. The results are provided in the table.

Test	Number of Trials	Rxx
RT1	5	.58
RT2	5	.83
MT	5	.95
G1	2	.98
G2	2	.98
RP	2	.38
RG	2	.80
B1	2	.75
B2	2	.73
H1	2	.57
H2	2	.38
H3	2	.67

The results indicate good Rxx for the G1, G2 and MT, acceptable Rxx for RT2 and RG, marginal Rxx for B1 and B2, and low Rxx for RT1, RP, and H1 to H3. These data indicate that researchers who are measuring these or similar variables should carefully examine the Rxx of their results. Future research should determine measurement protocols necessary for reliable evaluation of the motor performance of older subjects.

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Tuesday, April 14
2:45-3:00 p.m.

A COMPARISON OF TRIALS-TO-CRITERION AND SEQUENTIAL PROBABILITY RATIO TESTING.

Patricia Patterson, San Diego State University; Bethany Shifflett, San Diego State University.

Criterion-referenced tests can be used to estimate a person's domain score, *p*, or to place examinees into mastery states. Traditionally, these two purposes have been achieved through use of a fixed length (FL) test. An alternative model, sequential testing, allows the number of trials to vary for each individual generally resulting in a shorter test than a comparable FL test. Sequential probability ratio (SPR) testing has the additional feature of controlling misclassification errors. However, it requires a computer generated score sheet and cannot be used to estimate domain scores. Trials-to-criterion (TTC) testing, on the other hand, can be used to estimate domain scores, to classify students, and simply requires the tester to keep track of the number of trials to reach a predetermined success criterion, *R*. The purpose of this study was to compare the reliability of both SPR and TTC when reliability is defined as the consistency of classification. Data from the measurement lab at the University of Wisconsin were used for analysis. One hundred ten beginning male and female golf students took a golf chip test on two separate days within one week. Test specifications for the SPR test were $\alpha = \beta = .05$, $\theta_0 = .70$, and $\theta_1 = .50$. Mastery levels for the TTC test were .70 and .60 with success criteria ranging from R = 6 to R = 12. Both *P* and *kappa*, were calculated under each plan. Results for the total group indicated that reliability was higher with the SPR test (*P* = .83) when the mastery level was .70 (*P* = .53 to .68) and similar or slightly higher when the mastery level was .60 (*P* = .66 to .79). Median test lengths for the group were 21 (range = 13 to 30) for the SPR test and 12 (range = 9 to 19) for the TTC test. The median domain score for the group estimated from the TTC test was .67. These data suggest that SPR testing would be the preferred approach when misclassification errors are of primary importance, such as to determine minimal competency for certification. However, TTC testing is recommended for classroom tests due to ease of administration, shorter test length, and adequate reliability estimates.

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Tuesday, April 14
3:00-3:15 p.m.

THE EFFECTS OF A BEHAVIORAL MODEL OF SUPERVISION ON THE SUPERVISORY BEHAVIORS OF COOPERATING TEACHERS. Reginald T. A. Ocansey, University of Virginia.

Research in teacher education clearly indicates that student teachers are receiving feedback that is vague and incomplete from supervisors. For feedback provided to student teachers during conferences to be effective, it must be communicated with more details. Student teachers can then be held accountable for their performances. The purpose of this study was to train cooperating teachers in a Behavioral Model of Supervision-Physical Education (BMS-PE) to communicate feedback with more details, and to hold student teachers accountable for their performances during post-teaching conferences. Four research questions provided the structure for the study. The questions were related to the degrees of explicitness of tasks and types of accountability statements communicated to student teachers during post-teaching conferences. The effects of the BMS-PE was tested with four cooperating teachers during a ten week student teaching experience in a multiple baseline across subjects. Data was collected through audio recordings and analyzed using the Observational System for Post-Teaching Conference Analysis-Physical Education (OSPTCA-PE). This analysis provided details of: 1) the explicitness of task specifications, and 2) the type of accountability statements emitted by cooperating teachers. The results indicate clearly that the BMS-PE can facilitate the conduct of effective post-teaching conferences by: 1) increasing the communication of fully explicit tasks and type 3 accountability statements, and 2) decreasing the communication of implicit tasks and type 1 accountability statements. It was concluded that the BMS-PE can facilitate the demonstration of effective supervisory behaviors of cooperating teachers which are compatible with the teacher education program goals. The potential of the BMS-PE is justifiable to the extent that it provides useful contribution toward the conduct of effective post-teaching conference.

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Tuesday, April 14
3:45-4:00 p.m.

DEVELOPMENT OF AN INVENTORY FOR RECORDING PUPIL CONTROL TECHNIQUES USED BY ELEMENTARY SCHOOL PHYSICAL EDUCATORS

Steven A. Henkel, Bethel College

Lack of discipline was deemed the most important problem confronting American schools during 15 of the last 17 years. As a result, the problem was established as a research priority by the American Federation of Teachers. Discipline contributes to effective classroom management, and to the larger social purpose of the school. Little was known about specific control techniques used to achieve discipline in the physical education setting. The investigator developed an inventory for recording control techniques used by elementary school physical educators to control their pupils. The inventory contains 29 categories of control techniques which evolved from 64 live observations and audiotapes of eight teachers. Data were reduced using the strategies of analytic induction, constant comparison, and topological analysis. The investigator placed categories into three classifications: anticipatory (preceding misconduct), punitive (responding to misconduct punitively), and tutorial (responding to misconduct nonpunitively). Intraobserver reliability tests, conducted for 23 categories, yielded results ranging from 88 to 95 percent agreement. Interobserver scores ranged from 81 to 88 percent agreement. Inventory categories were validated by triangulating data across observations, audiotapes, interviews, and surveys. Teachers confirmed using techniques during interviews, and subsequently indicated frequency of use on the surveys. The collective data provided larger contexts or "disciplinary systems" in which to situate particular techniques. Recommendations for future research include (a) examining the relationship between pupil control ideology and use of control techniques, and (b) using control techniques to improve instructional outcomes. The form of control techniques is suggested as a key variable for enhancing the outcomes of pupil self-discipline and moral instruction. Forms (i.e., command, question, suggestion) are differentiated by the amount of decision making allotted students regarding their conduct. The inventory may be used in teacher education to expand the repertoire of control techniques among prospective teachers. Prospective teachers may also modify the inventory to monitor pupil conduct and personally selected control techniques.

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Tuesday, April 14
4:00-4:15 p.m.

EVALUATING MASTER TEACHER PERFORMANCE: A FIVE YEAR LONGITUDINAL STUDY.

Ray T. Cool, Andrew H. Hawkins, Robert L. Wiegand, West Virginia University.

Teacher education should adopt as a primary goal the development of competencies needed to create and maintain the learning environment (Medley, 1979). The maintenance of these competencies and the maintenance of the learning enviornment are areas of significance in the pedagogical process. The purpose of this study was to examine the ability of master teachers to maintain the learning environment and those competencies by which they were awarded master teaching rating (Bahneman, Hawkins and Wiegand, 1982). The subjects (N=5) employed in this study were those physical educators who obtained the M.S. - Master Teacher degree at West Virginia University during the 1981-82 school year. All subjects were then evaluated each year 1982-86 while they remained employed as full-time physical education teachers in the public schools of West Virginia. Subjects were evaluated utilizing a student-teacher process behavior observation system developed by Hawkins, Wiegand, and Bahneman (1983). The cummulative group data for this study indicates a decline in both teacher competencies and in the learning environment as inferred by student process behavior over time. An examination of individual data shows, after only two years, that all but one subject failed to maintain master teacher competencies and appropriate student behavior levels. Maintaining competencies is more difficult than achieving them (Siedentop, 1983). This study showed a decrease in competency over time. The maintenance of teacher competencies and the learning environment is an area of the pedagogical process warranting further investigation.

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Tuesday, April 14
4:15-4:30 p.m.

THE IMPACT OF VARYING AMOUNTS OF LESSON RESPONSIBILITY ON PRESERVICE TEACHERS' ABILITY TO OBSERVE Pamela C. Allison, Bowling Green State University

The ability to observe critically has been linked conceptually to teaching success, thus, providing impetus for teacher educators to examine the development of the skill of observing in preservice teachers. The focus of this study was to describe the relationship between preservice teachers' ability to observe in a field setting and the amount of lesson responsibility assigned for that setting. The specific question that framed the study was, "How does the amount of teaching responsibility for a lesson, varying from none to partial to total, impact the preservice teacher's ability to observe field lessons?" The participants in the study were six junior physical education majors at Bowling Green State University. The context was the second level methods course taken just prior to student teaching, meeting 12 hours per week in a private elementary school. The data sources gathered at each of the three levels of teaching responsibility were (a) reflective written narratives, (b) audiotapes of concurrent observations, and (c) post-observation/teaching interviews. The data were searched for recurring themes using the analytic technique of pattern coding. Five themes were noted across all participants. As the amount of teaching responsibility for the lesson increased, the preservice teachers (a) moved from observing movement behavior almost exclusively to observing cognitive and affective behaviors as well, (b) observed more detail in movement behavior, (c) shifted from a systematic strategy to more haphazard strategies for focusing attention, (d) focused on one thing for shorter periods, and (e) attended less to the whole class and more to individuals. Also to be noted were the teachers' reports that factors other than lesson responsibility, for example the children's skill level, were powerful in impacting their ability to observe. An implication for teacher educators is an increased awareness that placing preservice teachers in field experiences with varying amounts of lesson responsibility has an effect on what and how they gather observational information for teaching. This awareness should guide the design and conduct of field experiences.

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Tuesday, April 14
4:30-4:45 p.m.

RELATIONSHIP BETWEEN ACADEMIC LEARNING TIME-PHYSICAL EDUCATION AND PERFORMANCE OF TRACK AND FIELD ATHLETES.

Shelly Hays, Thomas Wandzilak, Charles J. Ansorge, and John Scheer, University of Nebraska-Lincoln.

The purposes of this study were to (1) investigate patterns of motor appropriate behavior as measured by Academic Learning Time-Physical Education (ALT-PE) for selected events in three track and field programs, and (2) determine the relationship between ALT-PE and performance in these events. Subjects were 33 sophomore and 27 freshmen female track and field athletes who participated in the 1986 season in one of three different events: 100-meter dash, long jump, or shot put. Subjects were from three schools that were a part of the same conference. School selection was based on demographic similarities and the ability of the teams to represent a successful, unsuccessful and average program based on points scored at a district track meet during the 1985 season. Siedentop, Tousignant and Parker's (1982) revised concept of ALT-PE was used in order to code and collect data. A total of 31,680 behaviors were recorded by trained observers. Performance scores for three events were obtained during the first, sixth, and eleventh weeks of the season. Separate 3 X 3 mixed-model ANOVAs were used to assess changes in ALT-PE across the season and determine if there was a difference among the three participating schools for each of the track and field events studied. Results indicated that there were significant (alpha = .05) differences in proportions of ALT-PE among the schools in each of the events. Performance scores improved across the season for all events, but no difference was detected among the school means. No relationship was found between ALT-PE and performance for any of the three track and field events. However, the team with the best won-loss record also had the highest ALT-PE and the best performance scores in each event. This team also had an ALT-PE pattern that differentiated itself from the other two teams in the study. Although ALT-PE has become an accepted measure of student achievement, its relationship with success in competitive sport is still unclear. The collection of ALT-PE appears to provide pertinent information on practice time utilization that can lead to the improvement of training methods.

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Tuesday, April 14
4:45-5:00 p.m.

PROFILES OF TEACHING BEHAVIORS OF STUDENTS ENROLLED IN A BEGINNING COURSE ON TEACHING EFFECTIVENESS

The purpose of this study was to investigate the development of selected teaching behaviors of physical education majors as they progressed through their first major clinical experience during one semester of a teacher preparation program. The subjects were ten (N=10) randomly selected students from a class of 28 first semester juniors. A descriptive experimental design was used. Each subject was video-taped teaching a 30 minute preliminary lesson to a group of 15 fifth grade children on the skill of dribbling a ball with the hands. During the course students taught two closed skills and two open skills to small peer groups and one open skill to a group of approximately ten middle school students. All lessons were audio-taped and evaluated according to pre-determined teaching compentencies. At the end of the semester the ten subjects taught another 30 minute video-taped dribbling lesson to fifth grade children. Systematic observation was used to document the specific teaching behaviors that served as dependent variables. The dependent variables included skill and behavior feedback, the quality and quantity of practice trials, classroom management techniques, instructional techniques, and content development. Data using continuous (time) variables were analyzed using ANOVA. Discrete variables were analyzed using Wilcoxon Rank test for paired samples (Chi-square). Results indicate that these beginning pre-service teachers made significant changes in their behavior by reducing their average length of transition times; by reducing student off task/waiting time; by using demonstrations; and by checking for clarity. Trends also indicate lower management time, longer activity time, better use of closure, and the provision of summary cues. Results reveal inconsistencies in teaching behaviors. Students can focus on a few selected variables during each teaching episode, but have a difficult time developing consistent patterns of effective teaching, especially with respect to content development and some of the more complex instructional techniques.

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Tuesday, April 14
5:00-5:15 p.m.

THE EFFECTIVENESS OF A PERSONALIZED FITNESS MODULE ON KNOWLEDGE, ATTITUDE, AND CARDIOVASCULAR ENDURANCE OF FIFTH GRADE STUDENTS: THE "HEART SMART" PROGRAM. Denise C. Serpas, LSU Medical Center, National Research and Demonstration Center-Arteriosclerosis (LSUMC, NRDC-A); Stephen J. Virgilio, Barbara L. Warren, University of New Orleans; Gerald S. Berenson, LSUMC, NRDC-A.

The purpose of this study was to determine the effectiveness of a Personalized Fitness Module (PFM), when compared to a Traditional Fitness Unit (TFU) in terms of fitness knowledge, attitudes toward physical activity, and cardiovascular (CV) endurance of fifth grade students. Ninety-five subjects from intact physical education classes at two public schools were examined. Similarities among the schools and the teachers were identified followed by random assignment of treatment. Subjects ($n=48$) from the experimental school participated in the PFM, a component of Superkids-Superfit: The "Heart Smart" Program. The PFM is an instructional module designed to develop knowledge, behavioral skills, and patterns of physical activity through personalized and non-competitive CV-healthy activities. Subjects ($n=47$) from the control school participated in the TFU, a traditional teacher-centered approach to CV fitness. The skills and activities in the TFU are consistent with the PFM, however, the personalized approach was not used. All subjects engaged in a seven week program consisting of 14 lessons, 55 minutes each, administered twice weekly. Pre- and post-test measurements of knowledge, attitude, and CV endurance were obtained using the Superkids-Superfit Knowledge Test, Simon and Smoll's (1974) Children's Attitudes Toward Physical Activity (CATPA) Inventory, and the one mile run/walk, respectively. Data were analyzed using group means of the gain scores of the eight dependent variables (fitness knowledge, six subscales of CATPA, and one mile run/walk time), followed by a multivariate analysis of variance (MANOVA). The MANOVA indicated a statistically significant difference between the two groups ($F=2.87$, $df=8$, $p<0.05$). A discriminant function analysis was computed as a post hoc test to identify the relative contribution of each variable to the function. The dependent variable one mile run/walk time contributed most to the function (0.91) and the structure (0.80) coefficients, statistically confirming improvement for the PFM group. These findings suggest that the Personalized Fitness Module, when appropriately implemented, can substantially improve cardiovascular endurance as measured by one mile run/walk time.

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Tuesday, April 14
5:15-5:30 p.m.

ADVANCED PROGRAMMING OF ARM AND DIRECTION PARAMETERS: THE EFFECT OF STIMULUS-RESPONSE ARRANGEMENT. Lanie A. Dornier, Auburn University; T. Gilmour Reeve, Auburn University.

Effects of stimulus-response arrangements on programming of arm, direction, and extent parameters were examined using the precuing method. Experiment 1 examined programming of parameters using stimulus-response arrangements similar to those used by Larish (1986) and Larish and Frekeny (1985). Results from Experiment 1 replicated previous research that has found reaction times to program the direction parameter were slower than reaction times to program the arm parameter. In Experiment 1 decision requirements and programming of parameters were confounded because different stimulus arrangements were used to specify the different response parameters. The precue array to program arm required a decision from spatially arranged right-left stimuli, whereas, the array to program direction required a decision from spatially arranged top-bottom stimuli. Experiment 2 examined programming of the same parameters used in Experiment 1 but with a stimulus-response arrangement that allowed for all decisions to be based on stimuli that had identical spatial arrangements. Results from Experiment 2 were the opposite of results from Experiment 1. Reaction times were slower when arm had to be programmed as compared to when direction had to be programmed. In addition, programming extent in situations with two arms, required more time than programming extent in situations with a single arm. The major finding from this study was that equating stimulus arrangements for precuing of arm and direction parameters yielded different results from those previously found. Previous studies attributed differences in reaction times to motor programming effects. This study indicated that decision processes were contributing to those differences. Additionally, this study provided evidence that reaction time differences were due to differential coding operations for various stimulus-response arrangements. Coding operations reflect response decision processes rather than motor programming processes.

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Wednesday, April 15
2:00-2:15 p.m.

CONTROL OF SEQUENCED RESPONSE COMPONENTS IN A COINCIDENT-TIMING TASK.

Allen W. Burton, University of Minnesota.

There are two essential problems that a human faces in interacting with the environment through the medium of movement: coordination and control. The problem of coordinating the many degrees of freedom in the human body may be resolved by the joining of several "free" variables into a stable, constrained relationship, while the solution to the control problem may involve the flexible assignment of various parameter values to the functional relation. This experiment, focusing on the concept of control, was designed to determine whether relative-timing patterns remain constant for a limited range of total response times and then abruptly change at some critical scale value, as hypothesized above, or whether timing patterns gradually change as total response times are scaled up or down. Ten right-handed college students performed 25 trials of a five-component coincident-timing task at each of 10 different response durations (ranging from 0.9 to 3.6 s). The apparatus consisted of a six-button response board interfaced to an Apple II+ microcomputer, with each of the five distances between buttons being distinctly different. The response durations were specified by a tone generated by a buzzer and were counterbalanced using a 10 x 10 Latin-square design. The time allocated to each response component was free to vary. The dependent variables were movement time (MT--the time to move from one button to the next) and average movement velocity (MV--component distance divided by MT), measured for each of the five response components. The main analyses involved the plotting of mean percent MTs and mean proportional MVs across the response-duration conditions and the determination of the most-frequently-occurring orders of MT components (from longest to shortest) and MV components (from fastest to slowest) for each block of 25 trials. The results indicated that the continuity of the order of MT components across the 10 speeds for individual subjects was extremely limited with a variety of specific patterns occurring both within and across subjects. For MV orders, however, the degree of continuity was much greater, with 7 out of the 10 subjects exhibiting the same most-frequently-occurring order across at least five consecutive speeds. The most striking feature of this general result was that the transition was only temporary (lasting across one to five components), being preceded and followed by proportional MVs of similar component values and identical component-value orderings. Thus, the results of this experiment supported the concept of control in which relative-timing patterns are essentially invariant across a range of parameter values and suggested that MV is a more important control factor than MT. The transition points, however, were neither clearly abrupt or gradual, but were transitory in nature.

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Wednesday, April 15
2:15-2:30 p.m.

PSYCHOMOTOR SCREENING FOR USAF PILOT CANDIDATES: ENHANCING PREDICTIVE VALIDITY. Richard H. Cox, Kansas State University.

The purpose of this research was to study the predictive relationship between psychomotor ability and success in Air Force Undergraduate Pilot Training (UPT). A secondary purpose was to compare the predictive validity of several potential independent variables.

Subjects for this research were 290 prospective pilots who entered UPT and were tested on the Two Hand Coordination (2HC) and Complex Coordination (CC) psychomotor tests. Each test station was equipped with a PDP-11/04 minicomputer with expanded power supply, a Cathode Ray tube display monitor, and two dual-axis joysticks. In all prediction analyses, the dependent variable was UPT outcome. Five basic independent variables have traditionally been derived from the two psychomotor tests. These five are: a) horizontal error on 2HC, b) vertical error on 2HC, c) horizontal error on CC, d) vertical error on CC, and e) horizontal error on the CC "rudder" task. Moreover, an additional 31 performance measures were derived and studied.

The results of several multiple correlation analyses indicate that performance on the two psychomotor tests is significantly related to UPT outcome. Prediction models based on early trial data (trials 1-4) and total trial data (trials 1-10) were observed to yield higher $\underline{R}$ values than a model based upon late trial data (trials 7-10). Since the Air Force practice was to use only late trial data in prediction equations, this is an important finding. Regressing the basic five independent variables on UPT outcome yielded $\underline{R}$ values of 0.330, 0.318, and 0.281 for early, total, and late trial data respectively.

Cronbach alpha coefficients were calculated to determine the reliability of the selected independent variables. In all but one case, the reliability coefficients were between 0.92 and 0.99, suggesting that the two psychomotor tests were extremely consistent and stable. Furthermore, the alpha coefficients for the 10 trial data were consistently higher than for either the early or late trial data.

The incremental validity of the basic five variable model was not significantly improved by stepping in predictor variables associated with total "stick movement" and the "hypotenuse" of X and Y absolute error ($\underline{p} = 0.146$). A stepwise multiple reqression analysis revealed that the best two variable prediction equation included the hypotenuse of X and Y absolute error for CC, and Y absolute error for 2HC ($\underline{R} = 0.306$). In conjunction with other basic ability tests, psychomotor testing is a promising predictor of UPT success.

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Wednesday, April 15
2:30-2:45 p.m.

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Induced Biases to the Motor System:Effects on Performance and Learning. Charles Shea, Wayne Shebelski, Robert Kohl & Mark Guadagnoli, Texas A&M University.

A growing verbal and motor literature indicates that varing the external context (e.g., increasing contextual interference) within which tasks are performed results in temporary performance decrements but facilitates retention/transfer. Presumably, the varied external contexts induces the performer to allocate greater processing resourses in an attempt to compensate for the errors resulting from the changing context. The present experiment attempts to extend these finding to situations in which the internal state (i.e., internal context) of the performer is varied by means of posttetanic potentiation (viz., postural hysteresis). Evidence from our laboratories clearly indicates that the potentiating effect of a sustained contraction (20 sec) persists long enough to disrupt subsequent responses and the bias induced increases as the force of the contraction increases. Subjects (N=72) were randomly assigned to either a constant or varied induction group. The constant group was instructed to exert the same force (30% MVC) against a force transducer for 20 sec prior to each block (10 hits) of trials while the induction force was randomly varied from 10 to 60% MVC for the varied induction group. The experimental task was to 'hit' the padded arm of the force transducer in an attempt to produce 200 n of force. Errors were displayed as deviations from a target line displayed on a computer monitor. All subject completed 40 acquisition blocks on Day 1 and 5 retention blocks on Day 2. Retention blocks were preceeded by 30% MVC inductions. The results indicated that acquisition performance was inferior for the varied induction groups with biases (+ CE) increasing as the induction increased. However, the varied induction group was superior to the constant induction group on retention. We interprete these results in terms of a common conceptual framework concerning contextual variables. This framework distinguishes between internal context and external context as sources of variability but not in terms of its impact on the processing information.

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Wednesday, April 15
2:45-3:00 p.m.

Contextual Interference: Contribution of Space and Lag Effects. Charles Shea, Robert Kohl & Mark Guadagnoli, Texas A&M University.

There is a growing body of evidence in the motor domain demonstrating decremental performance effects resulting from contextual interference, but enhanced learning effects (e.g., Shea & Morgan, 1979; Magill, 1983). The purpose of this study is to determine the extent to which spaced (time between repetitions) and lag (number of attempts at alternative responses between repetitions) affects performance and learning of a rapid motor task. The verbal literature is rich with demonstrations showing enhanced learning effects resulting from spaced and lagged practice (Glenberg, 1977; Jacoby, 1982). It is hypothesized that increasing the time between repetitions and/or the increasing the number of intervening trials will result in decrements during acquisition but facilitate retention and/or transfer. Subjects (N=72) were randomly assigned to one of twelve groups. The groups differed in terms of the inter-trial interval (2, 10, 20 or 30 sec) and number of intervening trials (0, 1 or 3). During each acquisition block, subjects were asked to 'hit' the padded arm of the force transducer in an attempt to elevate a trace on the computer screen to 5 targets representing 175 nts of force. All subjects completed 17 acquisition block in one session and 5 retention/transfer blocks after approximately 24 hrs. Retention/transfer trials were presented at 2 sec intervals with 0 intervening trials. The retention data indicated subjects that were exposed to lag and spaced manipulations performed better on retention. These results were interpreted as being consistant with notions of contextual interference. Further, explanations were taken from the verbal learning literature to explain these effects. That is lag and spacing promote increased encoding variability (Glenberg, 1977) and increased processing/elaboration (Jacoby, 1982).

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Wednesday, April 15
3:00-3:15 p.m.

AN INVESTIGATION OF A MULTI-DEMENSIONAL APPROACH TO WEIGHT REDUCTION

William Chen, Keith Tennant, Robert Allen, Judy Perkin, University of Florida, and Jerry Lafferty, Georgia Southern College

The purpose of this study was to investigate the effectiveness of a multi-dimensional program that includes behavioral modification/nutrition education and biofeedback relaxation training in assisting individuals to reduce body weight. Thirty six overweight subjects (20 to 40 percent over ideal body weight) solicited via newspaper ads were randomly assigned to one of the following three groups: 1) biofeedback and behavioral modification/nutrition education group (BF); 2) behavioral modification/nutrition education group (B); and 3) control group (C). Baseline measurements of body weight, percent body fat, muscle tension (frontalis EMG), self-reported anxiety level (Taylor Manifest Anxiety Inventory), health locus of control, and a SMAC 25 blood test were collected during the first two weeks of the study. After the baseline measurements, subjects in the BF group were given both EMG training and a weight reduction/nutrition education program for six weeks. Subjects in the B group received only the weight reduction behavioral modification/nutrition education program. At the same time, subjects in the C group received no special treatment at all. Following the six week program, all subjects including control subjects, were given a posttest identical to the pretest measurements. Due to subject attrition and potential differences in dependent measures before treatment, an analysis of covariance was utilized for data analysis. The results revealed significant *F* ratios for the dependent measures of body weight and muscle tension. The weight loss for both BF and B groups were significantly greater than that of the control group. However, the weight loss was not significantly different between the BF and B groups. In addition, the subjects in the BF group showed the most significant tension reduction when compared with subjects in the B and C groups. The other dependent measures, with the exception of blood glucose, were not significantly different. The results of this study seem to indicate that biofeedback relaxation training, in conjunction with behavioral modification/nutrition education, enhanced weight loss and tension reduction.

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Wednesday, April 15
3:45-4:00 p.m.

ANALYSIS OF THE MAJOR STRESSORS FOR COLLEGE STUDENTS.

Dewayne J. Johnson, Florida State University; Virden Evans, Florida A&M University; Joe P. Ramsey, Florida International University.

The purpose of this investigation was to analyze the perceived stress of college students in an attempt to identify the major sources of stress. Subjects were 403 college students from Florida A&M University and The Florida State University, including all levels, freshman through senior. Students of intact classes were asked to complete a questionnaire that included a personal data sheet and a stress inventory. The stress inventory provided scores in 10 areas related to stress plus a total stress score. These areas included deprivational stress, patterns of behavior, frustration, self perception, anxious-reactive personality, overload, knowledge, opinion, coping strategies, and a life events score. Stepwise multiple regression was run (all subscores were used as independent variables) in an attempt to determine the best set of factors that would explain the variation in the total stress score (dependent variable) of students. Results of the regression analysis indicated that 90% of the variation in the stress of college students could be attributed to type A personality, anxiety, the demands of college life, and a low self concept. Results further indicated that the college students in this study did not perceive their stress levels as being high, or above average. Based on the results of this study, it may be concluded that events and activities associated with college life are not the major stressors for college students, and that intrinsic stressors rather than extrinsic stressors account for the largest percent of the stress of college students.

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Wednesday, April 15
4:00-4:15 p.m.

R. C. Westerfield, Ph.D. and Stephen Nagy, Ph.D. Health Education Department, The University of Alabama, Tuscaloosa, Alabama.

THE OCCURRENCE AND CHARACTERISTICS OF WORKPLACE HEALTH PROMOTION ACTIVITIES IN ALABAMA.

During the past decade there has been an increase in health promotion activities (HPA) at the worksite. Most research evaluating worksite HPA has focused on businesses/corporations dominated by "white collar" employees. The purpose of this investigation was to determine the extent and interest in HPA by "blue collar" industries. A survey of mining and manufacturing industries with more than 100 employees was conducted in Alabama to determine: 1) the types and extent of workplace health promotion; 2) the interest in implementing health promotion activities (HPA); and (3) the perceived factors which influence the likelihood of HPA. A stratified random sample (N=335) from 1,050 mining and manufacturing companies yielded 198 returns (59.1%). One or more HPA were utilized by 120 companies (60.6%). Frequent HPA were accident prevention (54.0%), first aid/CPR (35.5%), hypertension control (29.3%), physical fitness (25.8%), alcohol/drug programs (24.7%), and smoking cessation 24.2%). Only 142 companies (71.7%) were confident of the beneficial aspects of HPA. Of the companies without HPA programs, only 43.9% were interested in implementing programs. Employer interest was greatest for smoking cessation (57.1%), accident prevention (56.6%), alcohol/drug (54.1%), physical fitness (53.6%) and stress management (51.0%). Factors which adversely affected HPA were lack of facilities and trained personnel (35.9%), lack of knowledge about HPA (25.3%) and lack of financial means (21.7%). ANOVA and Chi sq. indicated significant (P<.01) differences between company size and 1) HPA; 2) interest in HPA; and 3) perceived benefits of HPA.

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Wednesday, April 15
4:15-4:30 p.m.

SELF-ESTEEM AND SUBSTANCE USE AMONG ELEMENTARY AND MIDDLE SCHOOL STUDENTS.

Ann Moore, University of Arkansas; Denise Bakema, University of Arkansas; Michael Young, University of Arkansas.

Problems related to the use and misuse of both legal and illegal drugs constitute a major threat to public health. Media reports indicate that the use of drugs is occurring in ever younger age groups. Drug Education programs, especially those directed toward school age children, often seek to assist children to develop positive self esteem and learn good decision making skills. The purpose of this study was to document the relationship between self esteem, the use of both legal and illegal drugs and decision making skills. As part of an educational training project funded by the Arkansas Office of Alcohol and Drug Abuse Prevention, students in grades 4-8, representing 16 schools across the state, voluntarily completed, in a classroom setting, an anonymous questionnaire concerning drug use. The questionnaire included the Hare Self Esteem Scale (which includes the subscales: peer self-esteem, school self-esteem and home self-esteem), and items concerning the use and expected use of coffee, cigarettes, smokeless tobacco products, alcohol and "marijuana, cocaine and other illegal drugs". Data were collected at the beginning of the 1986-87 school year. At the same time of this writing all data have been collected, but data entry and data analysis are not complete. The results reported in this abstract are preliminary results based on 473 students from three schools. Our final paper will include data from more than 2,000 students from all 16 schools. Preliminary data analysis has been accomplished utilizing the statistical package SAS "Proc GLM" procedure. Major findings: (1) of the 18 measures of substance use and expected use, school self esteem was significantly ($p < .05$) related to 17 measures; (2) home self esteem was significantly ($p < .05$) related to frequency of reported use of coffee, smokeless tobacco and having "ever been drunk"; (3) peer self esteem was significantly ($p < .05$) related to only one measure of expected use; (4) choice of a resource person for help in decision making concerning drug use was significantly related to self esteem as measured by each of the three subscales; (5) expected course of action in a peer pressure-drug situation was significantly related to school and home self esteem. The preliminary results of this study indicate that the use of both legal and illegal drugs does occur even among elementary and middle school children. The findings support the idea of self esteem promotion as part of a drug education program. The findings also highlight the important role that parents and teachers can play by promotion of self esteem in the home and school.

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Wednesday, April 15
4:30-4:45 p.m.

A STUDY OF WORKSITE WELLNESS PROGRAMS IN IDAHO, OREGON, AND WASHINGTON BUSINESS ORGANIZATIONS. Dwaine J. Marten and Chris E. Greenfield. University of Idaho.

The purpose of this study was to: (1) determine Northwest business organizations currently offering worksite Wellness Programs, or interested in implementing future Wellness Programs; (2) identify current wellness activities being offered; (3) identify professionals currently responsible for conducting wellness training activities; (4) identify skills/competencies important for employment in worksite Wellness Programs; (5) compare these results with other studies on curricula of health/fitness management professional preparation programs. One hundred thirty-six completed questionnaires were returned from the organizations. Frequency distributions were used to describe the questionnaire data. Seventy-two of the responding organizations were currently offering worksite Wellness Programs and 64 organizations were interested in starting a program. Over 70% of the organizations presented service activities in smoking cessation, fitness and stress management; whereas, only about 50% of the organizations provided activities in weight management and nutrition. Evaluating blood pressure and conducting health risk appraisals were the most popular screening activities, along with programs stressing the harmful effects of smoking and stress and benefits of exercise. The aerobics instructor was responsible for teaching 53% of all fitness activities. Others with minor fitness responsibilities were the nurse, physical education instructor, and the physiologist. Seventy-seven percent of the organizations considered communication skills as the primary competency skill. Other competencies considered important were management skills, counseling skills, and only about 25% considered physical education and fitness skills as important. Based on Cottrell's et al study, professionals in higher education consider competencies in nutrition/diet management, exercise prescription, fitness management, C.P.R., weight control, and evaluation procedures, more important than competency skills in communications, management, and counseling. The results of these studies raise interesting questions: (1) Are we in higher education providing the appropriate competencies? (2) Do business organizations truly understand the competencies needed to conduct a successful program? (3) Is there a strong need for wellness education programs for business organizations?

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Wednesday, April 15
4:45-5:00 p.m.

SERIOUSNESS OF VARIOUS PROBLEMS OF ADOLESCENTS AND THE CORRELATES OF SELECTED VARIABLES. C. Jessie Jones and Barbara Warren, University of New Orleans.

Although the consquences of personal and social problems among children and youth has been nationally recognized by school systems as a crisis situation, there have been few studies investigating the prevalence and severity of specific problems and their relationship to academic achievement. The purpose of this study was to examine the seriousness of various problems affecting youth. In addition, the relationships among the seriousness of various problems, grade level and academic performance were investigated. A questionnaire (using a Likert Scale) was developed, and field and pilot tested for content validity, reliability, and utility of the instrument to elicit the seriousness of 60 specific problems and demographic information. A multi-stage sampling design was used to collect data from nine high schools (n=2023) throughout the State of Louisiana. The 60 specific problems were clustered to describe the following five problem categories: 1) school (SCH), 2) emotional health (EH), 3) personal (PER), 4) family (FM), and 5) social (SO). Data were analyzed using descriptive statistics to determine the seriousness of each problem, and Pearson Product Moment correlations ($p < 0.05$) to examine the relationships among selected variables. Findings revealed that, on the average, 1 out of 5 students reported a serious to very serious problem with grades (19.9%), controlling temper (18.8%), being nervous (18.6%), and depression (19.9%). Results also indicated significant inverse relationships between the seriousness of SCH, EH, FM, and SO problems, and grade level and grade point average. A significant inverse relationship was also found between PER problems and grade point average. Based upon these findings, it can be generalized that younger students who reported more serious problems have greater academic problems than older students. However, students at all grade levels who reported more serious PER problems, found their academic performance was adversely affected. It can be concluded that to improve academic achievement, one of the factors the school system needs to address is the various problems facing youth.

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Wednesday, April 15
5:00-5:15 p.m.

REPLICATING HEALTH EDUCATION RESEARCH: COMPARING SIX YEARS OF SEXUAL ATTITUDE CHANGE. Daniel D. Adame, Emory University, Atlanta, Georgia; Mary E. Taylor, The Pennsylvania State University.

The primary purpose of this paper is to report on, and compare the results from a sexuality-attitudes study replicated four times in the northeast and southeast at three different universities over a six year period. Since attitudes are seemingly in a process of continual change, with one of the more dramatic examples of this phenomena being the change in American sexual attitudes over the last few decades, a secondary objective is to demonstrate the value and importance of replicating studies in health education research. Each study employed a quasi experimental pretest posttest non-equivalent groups design, involving the administration of an 18-item, likert type sexuality attitude instrument designed for these studies. A total of 1,322 students completed the test during the first and last weeks of classes in each of the semesters data were collected. Multivariate analyses were conducted to determine whether there were significant changes in students' sexual attitudes based on their pre- and posttest responses. In each study, eight attitudes were ranked among the top five in which students reported experiencing change: homosexuality, male sex drive, consenting adults, contraception, masturbation, religious hang-ups, and abortion. Pre/posttest results in each study also showed students indicated their parents as the major influence shaping their attitudes toward sexuality, including those completing a course on sexuality. Attitudes students indicated they wanted to see change in society were: changes in the double standard, homosexuality, premarital sex, cohabitation, and the issue of rape. Replication of research leads to confirmation of results. Courses on sexuality education do effect significant changes in students' sexuality attitudes, but why some attitudes towards sexuality are more easily influenced to change, while others tend to remain the same, needs further investigation. Results from our studies can be helpful in building relevant curricula in sexuality education, and be especially useful to health educators teaching courses on human sexuality.

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Wednesday, April 15
5:15-5:30 p.m.

WHY NOT PLAY IN PHYSICAL EDUCATION?

Jennifer M. Beller and Sharon K. Stoll, University of Idaho

The purpose of this paper is to examine the philosophic basis of 'play' in physical education. Specifically, this argument will discuss: 1) current and historical perspectives of 'play' in physical education, 2) why we as physical educators have an aversion to any 'play' in our classrooms, and 3) the immediate need for the play-directed experience to be, as Kretchmar and Harper said, the "cornerstone" of physical education. We intend to show that historically, from the 1920's to the 1960's, physical education emphasized play in relation to skill acquisition, development of physical fitness, improved mechanical efficiency, and the values gained from social interactions. Objective and subjective educational needs were satisfied through the directed play experience. However, after 1960 play in the profession was replaced by the work ethic, which emphasized achievement, success, technological superiority, and objective criteria. Physical educators felt that we must work and teach in a highly structured, objective manner to pursue knowledge about physical education. Hence human movement, including play, is now objectively studied and analyzed. Unfortunately, the direction of physical education toward the scientific diminishes play in the classroom. The quality of the experience is measured in numbers, statistics, productivity, classifications, and efficiency. We hope to show that subjective play-directed experience encourages bodily understanding, movement potential, and meaning in relation to the surrounding world. Finally, we will present an example of meaning in play through a non-sophisticated approach to phenomenology that shows the merit of play in physical education.

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Thursday, April 16
9:00-9:15 a.m.

DELPHI STUDY OF THE CURRENT GOALS FOR ELEMENTARY SCHOOL PHYSICAL EDUCATION by Roy D. Johnson, Ph.D., Bowling Green State University and Molly Laflin, Ph.D., Bowling Green State University.

The purpose of this study was to determine the goals of elementary school physical education by practioners, administrators, and university professors. The impetus for the study was the apparent wide range of opinions among the participants at the Second National Conference on Preparing the Physical Education Specialist for Children (Orlando, Florida, October 20-23, 1984). A modified delphi technique was used to gather the opinions of these experts in the field of Elementary Physical Education. The first phase was an open-ended questionnaire. This phase was followed several weeks later by the second phase, a request to rank order and make comments regarding 20 goals formulated from the responses to the first phase. The final phase included a request to review: a) the group's mean rankings, b) other respondents' comments, c) the respondent's own previous rankings for each goal ranked. In addition, the respondents were asked to comment and to indicate any desired changes in their original rankings. Of the conference registrants (N=261), the response rates were 66% for the first phase, 59% for the second phase, and 53% for the final phase. The top seven goals that emerged were the development of: 1) Motor Skills, 2) Self-concept, 3) Effective/Efficient Movement, 4) Growth & Development, 5) Physical Fitness, 6) Fitness Attitude, and 7) Fun. Movement towards consensus was evidenced by minimal changes in group rankings for the top seven goals between the second and third phases and a decrease in the variance for each of the top seven goals. Many participants offered rationales for their rankings; a summary of these are discussed.

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Thursday, April 16
9:15-9:30 a.m.

A CRITICAL REVIEW OF RESEARCH ABSTRACTS PRESENTED AT THE 1985 AND 1986 NATIONAL AAHPERD CONVENTIONS.

Robert Koslow, The University of Alabama.

The purpose of this study was to review the quality of abstracts published in Abstracts of Research Papers 1985 and Abstracts of Research Papers 1986. Evaluations concerning tenure, promotion, salary, and hiring often take into account presentations delivered at AAHPERD conventions. Also, election to Fellow status in the Research Consortium is based, in part, on AAHPERD presentations. Research abstracts presented at national conventions are also bound for public viewing. Thus, it is imperative that each abstract be carefully reviewed. Abstracts containing references to quantitative data were reviewed to determine if information concerning the number of subjects, statistical techniques, and levels of significance were reported. All abstracts were screened for grammatical errors and misspellings. A review of the 1985 abstracts revealed that 10% did not indicate the number of subjects; 30% did not indicate specific statistical techniques; 25% did not indicate levels of significance; and 27% contained grammatical errors and/or misspellings. A review of the 1986 abstracts revealed that 10% did not indicate the number of subjects; 21% did not indicate specific statistical techniques; 34% did not indicate levels of significance; and 30% contained grammatical errors and/or misspellings. It was concluded that the 1985 and 1986 AAHPERD Research Abstracts were of poor quality. In many cases, an accurate assessment of a research abstract was severely limited by the lack of information provided in the abstract. In addition, the numerous grammatical errors and misspellings greatly detracted from the overall quality of the abstracts. If presentations at national AAHPERD conventions are going to be used to assess an individual's professional prowess, and used as a criterion for Fellow status in the Research Consortium, the abstracts must be subjected to a more stringent review process.

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Thursday, April 16
9:30-9:45 a.m.

DEVELOPMENT AS TRANSCENDENCE: AN EXISTENTIAL-PHENOMENOLOGICAL PERSPECTIVE OF HOW INDIVIDUALS AND THEIR MOVEMENT CHANGE OVER TIME. Janet M. Oussaty, Kennesaw College.

The purpose of this study was to propose the viewing of how individuals and their movement change over time as Transcendence. This perspective enlarges upon the more predominant view of development occurring as stages or sequences. The study was conducted through a conceptual inquiry of philosophical and curricular readings from both perspectives. The study first examined how each perspetive reflected the essential nature of time and change (Benjamin, 1981). It then explored how each perspective utilized time and change in terms of their respective thinking processes (Frazier, 1975, 1981; Wilbur, 1983) and curricular applications (Kohlberg & Mayer, 1972; Roberton & Halverson, 1984; Roberton, 1984; Macdonald, 1974, Canic, 1986; Ravizza, 1977; Allen & Fahey, 1977). The results of the study found that the conventional perspective offered a limited vantage point since movement was viewed as developing only in an externally defined/objective, physical, analytic, and bound manner. Meaning-making was not evident (Thomas, 1983; Metheny, 1968; Stone, 1981; Allen & Thomas, 1977; Kleinman, 1970). The alternative perspective was found to be more encompassing since it additionally viewed movement as developing in a personally defined/subjective, spiritual/mystical, experiential, and creative manner. Meaning-making was evident (Kleinman, 1986, 1979, 1970; Watson, 1986; Thomas, 1983; Allen & Fahey, 1977; Ravizza, 1977; Gallwey, 1974; Herrigel, 1971). The study also found that the movement described through this more encompassing perspective was not experienced in physical education classes (Kollen, 1983, 1981) and that a curricular ideology for this perspective did not exist. A framework for an ideology was thereby offered as an outcome of the study. The study concluded that it is through this ideological framework that individuals and their movement can attain their fullest potential.

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Thursday, April 16
9:45-10:00 a.m.

A Comparison of Male and Female Coaches' Philosophic Views Toward Interscholastic Athletic Programs. Barry C. Pelton, University of Houston and Michael E. Crowhurst, University of Houston.

The purpose of this study was to determine the philosophic views of male and female coaches toward Interscholastic Athletic Programs. Twenty concepts were selected from a philosophic inventory developed by Chellodurai, Ingles, Danylchuk, 1984. A volunteer sample of 185 males and 120 females attending the Texas Girls Coaches Association and the Texas High School Coaches Association participated in the study. Respondents were asked to rate each concept on a scale of Strongly Agree (SA), Agree (A), Strongly Disagree (SD) or Disagree (D). Percentages were computed which revealed individual male and female responses and a comparative analysis was made to determine differences between male and female responses. The results showed that while all subjects were in general agreement (SA, A) with concepts, males chose (SA) 10 percent more frequently than females on items 1 through 8 and 10 through 17. Females Strongly Agreed on only concepts 9 and 19 at a higher percentage than males. Males and females Strongly Agreed on concepts 18 and 20 at a near equal (1 percent difference) percentages. When male and female responses Strongly Agreed (SA) and Agreed (A) were submitted there was no concept in which the two groups were not in close agreement. Concepts 5, 8, 9, 17, 18, 19 and 20 were the only concepts where any respondent selected Strongly Disagree or Disagree. In no case was general disagreement (SD, D) greater than 11.83 percent by either group. With respect to the philosophic concepts in this study it is concluded that males philosophic views toward selected concepts concerning interscholastic athletics were held more intensely than females. However, when the responses of Strongly Agree and Agree were combined there was close agreement on the views by the respondents.

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Thursday, April 16
10:00-10:15 a.m.

A PHYSIOLOGIC PROFILE COMPARING FEMALE, PROFESSIONAL AND UNIVERSITY, BALLET AND MODERN DANCERS. Robin D. Chmelar, Barry B. Shultz, Robert O. Ruhling, Sally S. Fitt, Michael Zupan, Terry Shepard, University of Utah.

A physiologic profile comparing female, university and professional, ballet and modern dancers was undertaken to gain a more thorough understanding of the factors distinguishing these groups. A total of 39 subjects was divided into four groups: professional ballet (PB), professional modern (PM), university ballet (UB), and university modern (UM). The variables investigated were: aerobic capacity ($\dot{V}O_2$ max on the treadmill), isokinetic characteristics at the knee (Cybex® II), and anaerobic capacity (maximal blood lactates following the Wingate bicycle ergometer test). In addition, body composition was assessed using the Sinning equation and a general health and training questionnaire was administered.

A 2x2 between-groups MANOVA was performed on six dependent variables: percent fat, $\dot{V}O_2$ max, max blood lactates, quadriceps endurance, hamstring/quad (H/Q) peak torque ratio at 0°/s, and the H/Q ratio at 180°/s. The independent variables were level and style. A significant difference between the groups was determined by level ($p<.03$), by style ($p<.007$), and by the interaction of style and level ($p<.003$).

A stepwise discriminant function determined $\dot{V}O_2$ max and max blood lactates to be significant discriminators among the groups ($p<.001$). Further analysis determined that the PB group significantly differed from the others based on $\dot{V}O_2$ max, max blood lactates, and the H/Q ratio at 0°/s. The results showed that PB had lower $\dot{V}O_2$ max and max blood lactates but a higher knee flexion torque relative to knee extension torque than the PM, UB, and UM groups.

It was concluded that although theatrical dancers as an entire group demonstrate excellent levels of aerobic and anaerobic fitness, low percent body fat levels, and primarily normal strength values for the knee, significant differences may exist between various levels and styles of dancers.

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Thursday, April 16
2:00-2:15 p.m.

DANCE AND THE EMERGING FEMINIST AESTHETIC. J.A. Lazarus, Texas Woman's University.

"I myself have never been able to find out precisely what feminism is: I only know that people call me a feminist whenever I express sentiments that differentiate me from a doormat..." (West, 1913). Historically, women have not been accounted for in traditional research on the normal development of humans. This has resulted in an androcentric relegation of women's experiences to a realm outside of the norm. Women are perceived as deviations from the norm and designated as "other" (Gilligan, 1985). In the past fifteen years feminist scholars have begun to question and critique the world view of men, and to offer alternative perspectives arising from a uniquely female life experience and ideology. Theatre dance, as a mirror reflecting socio-cultural norms, is an appropriate site for exploring feminist ideology. The potential for increasing dance literacy through such an exploration is clarified by the anthropological understanding of dance as an indicator of world view (Kealiinohomoku, 1970). The purpose of this study was to examine the emerging feminist aesthetic as it illuminates the historical development and contemporary trends in Western modern dance and performance art. Methodologically, this examination begins with an explication of three feminist perspectives: Liberal, Left and Radical feminism with their respective goals of equality, liberation and integrity (Perreault, 1983). The feminist telos in the fields of science, literature and theatre are then discussed in terms of direct parallels between this academic research and the creative, dance research currently being explored and performed in Canada, Germany and the United States. Characteristics of the feminist aesthetic which are shared by and serve to integrate all four disciplines are enumerated, and then illustrated with dance-specific examples. These characteristics include 1). a sense of interconnectedness and relativity which negates the traditional sense of dualism, i.e. the dichotomy between art and life; and 2). a discursive, self-revelatory and subjunctive style based on an interweaving of observer/observed and of past/present/future, as opposed to a linear, hierarchical and authoritarian perception of nature. In this philosophical analysis the feminist aesthetic, a partly descriptive and partly prescriptive theory (Gottner-Abendroth, 1985), is applied to dance in order to affirm and illuminate woman's choreographic voice.

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Thursday, April 16
2:15-2:30 p.m.

AN ANALYSIS OF THE SPATIAL ORIENTATION OF CLASSICAL BALLET THROUGH LABAN'S GEOMETRIC MODELS.

Billie Lepczyk, Virginia Polytechnic Institute and State University.

Rudolf Laban devised geometric models that serve to locate the spatial orientation of movement. The models consist of the dimensions, planes, diagonals, octahedron, cube and icosehedron. The purpose of the study was to identify the spatial organization of the movement style of classical ballet. This entailed analyzing the *barre* work, body positions and vocabulary forms. The *barre* work is the key to the style. Every movement of ballet's vocabulary is based on these exercises. Methods of analysis included movement experimentation and observation of live and recorded movement. The terms of over 1,100 vocabulary forms listed in the *Technical Manual and Dictionary of Classical Ballet* (Gail Grant, 1982) served as a guide so that the study would be inclusive. Therefore, forms analyzed included those found in all four categories of ballet technique: *terre à terre*, *adagio*, *allegro* and *grand allegro*. Other resources included *The Gail Grant Dictionary of Classical Ballet in Labanotation* (Allan Miles, 1976) and *The Video Dictionary of Classical Ballet* (Ballet Makers Inc., 1983). The findings indicate that the movement style of classical ballet is oriented to the model of the octahedron. Ballet's movements include central pathways through the model and peripheral pathways which trace the edges of the model. The extensive vocabulary of leg work, the arm positions and the basic *port de bras* adhere readily to the octahedral model. Planal movement occurring in the *port de bras* and various vocabulary serve as a major spatial contrast. Examples include the *arabesque penchée* which creates movement in the sagittal plane and the *grand rond de jambe en l'air* which creates movement in the horizontal plane. Another major contrast is diagonal spatial tension. This is visible in the body position of *épaulé* and frequently in the twisting movement of *épaulement*.

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Thursday, April 16
2:30-2:45 p.m.

USE OF IMAGERY PROCEDURES WITH MILDLY MENTALLY HANDICAPPED PERSONS

Paul R. Surburg, Shirley Snyder Stumpner, Indiana University.

Imagery procedures have been investigated to ascertain their efficacy in motor skill development with normal subjects (Kohl & Roenke, 1983), to determine their role in word recognition with sighted and blind children (Pring, 1983), and to evaluate their effects upon reading comprehension in learning disabled children (Rose, Cundick & Higbee, 1983). To date, a paucity of research exists concerning the nuances of these techniques with mentally retarded subjects. Buckolz & Rodgers (1980) with normal subjects and Surburg (1984) with mentally retarded subjects have reported that catch-trial (CT) use reduces preparation levels. The purpose of this study was to determine the role of imagery procedures with mildly mentally handicapped adolescents (MIMH) in the facilitation of a perceptual motor skill. A primary focus was the manipulation of the preparation phase through CT use. Twenty-four MIMH adolescents from Bloomington High School North served as volunteer subjects. Dependent variables were measured as follows: subjects depressed a button following a ready signal, released this button after the onset of a light stimulus and touched target disc 48 cm. from the button (RpT). Movement time was derived by subtracting RT from RpT. Subjects were randomly assigned to a no CT group, a 30% CT group, or a 30% CT group with imagery practice. Before each trial subjects in this group closed their eyes and mentally rehearsed the task. Catch-trial situations consisted of a warning signal without subsequent presentation of the empirical stimulus. Preparatory intervals (PIs) of 1.5, 3.0 and 4.5 seconds were randomly presented to all subjects. Twenty-one trials constituted a testing session; these sessions were conducted on four separate days. A three-way ANOVA (groups x PIs x days) was conducted for each dependent variable. Significant main effects were found for groups with each dependent variable; the only other significant main effects were PIs for RT and days for RpT. There were days x PIs interactions for RpT and MT variables. Post hoc analyses provided the following results: the 30% CT group was significantly slower than the other two groups for all three dependent variables. While there were some variations among days with the dependent variables, the 1.5 sec. P.I. generally elicited the slowest responses. In conclusion, imagery procedures facilitated the execution of a psychomotor task with MIMH adolescents.

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Thursday, April 16
3:45-4:00 p.m.

PERCEIVED ABILITY IN SPORT BY PERSONS WITH PHYSICAL DISABILITIES.

Gail M. Dummer, Martha E. Ewing, Rochelle V. Habeck, Sara R. Overton. Michigan State University, East Lansing.

Participation in sport, including participation by disabled persons, is associated with positive outcomes such as improved physical fitness, better mental health, socialization opportunities, and positive self-concept. Perceived ability is a critical determinant of involvement and behavior in achievement situations such as sport. In sport, perceived ability may affect an individual's decision whether to compete, expected level of performance, effort during competition, and/or persistence (Roberts, 1984). Adults typically define perceived ability in terms of capacity to achieve (Nicholls, 1984). Capacity may be inferred cognitively from one's perception of task demands, the conditions under which one has to perform, and one's readiness for competition. The purpose of this research was to determine factors which influence perception of competence in sport by persons with physical disabilities. In this study, 167 athletes from the 1985 National Cerebral Palsy/Les Autres Games were asked to rate "ability to perform today" on a 9-point Likert-type scale prior to competition. ANOVA procedures were used to determine whether perceived ability was related to personal characteristics (level of disability, gender, training background), to expected performance level, and to event outcome (win/loss status). ANOVA results indicated that perceived ability was not related to level of disability, gender, frequency of training sessions, or to importance of sport in my life. Perceived ability was related to performance expectations ($F_{4,162} = 15.17$, $p < .01$) and to event outcome ($F_{1,137} = 5.32$, $p < .05$). Athletes who expected to "perform well today" and athletes who placed 1st, 2nd, or 3rd in their events rated themselves as higher in perceived ability than those who did not expect to perform as well or those who did not medal in their events. These results supported our assumption that disabled persons exhibit the same cognitive behaviors in sport situations as do able-bodied athletes. In this study, perceived ability did not depend upon the severity of an athlete's disability, indicating that athletes based their ratings of perceived competence on task demands, conditions of competition, and personal readiness for competition. Consistent with the literature, there was no significant gender effect. The literature indicates that perceived ability should be related to training/effort and to importance of sport in one's life. This was not found in the current study, perhaps because relatively few athletes trained on a frequent, regular basis and because almost all athletes considered sport to be a very important factor in their lives. The significant effects for expected level of performance and for event outcome indicate that these disabled athletes were able to realistically assess the demands associated with competition within their disability classifications.

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Thursday, April 16
4:00-4:15 p.m.

COMPARATIVE MEASURES OF AEROBIC FITNESS AMONG MENTALLY RETARDED ADULTS.

Jennifer H. West, University of Montana.

The present state of knowledge concerning physiological assessment of aerobic fitness among special populations has been deemed inadequate. Furthermore, many apply indirect quantifications of aerobic functioning to infer a successful program or enhanced fitness levels among handicapped exercise participants. The objective of this study was to determine the efficacy of the utilization of an indirect measure of aerobic functioning, that is, resting heart rate, to implicate gains in aerobic capacity among mentally retarded (MR) adult exercise participants. Accordingly, investigations of both direct (max V02) and indirect (resting heart rate) measures of aerobic fitness among seven MR adult volunteers, 22-36 years of age (mean IQ=56.7) were conducted throughout a twelve month, five-day-per-week, exercise program at the Ronan Special Citizens' Center, Ronan, MT. Resting heart rate was recorded daily and, through a Winsorized mean, averaged for a single monthly measure of aerobic efficiency. A progressive protocol on a Monark bicycle ergometer was utilized to assess max V02. The initial stage/workload was light, 1.0 Kg (300 KPM-min -1); additional resistances of .5 Kg were added each minute until exhaustion. Volitional exhaustion and a respiratory exchange ratio greater than 1.0 were the criteria to determine that maximal aerobic recordings had been attained. Respiratory exchange gases were analyzed with the Beckman Metabolic Measurement computer-based system. Pre and post exercise-intervention data revealed both significant physiological adaptations from training and strong correlations of direct and indirect measurements of aerobic fitness. A significant difference between pre and post mean sample resting heart rate was reported through a t-value of 7.30 $p < .01$ (two-tailed). A dependent t-test between pre and post maximum oxygen uptake testing held a value of 6.498 $p < .01$ (two-tailed). The correlative r of .82 further affirmed an observed 26% max V02 enhancement among this specific sample and the appropriateness of an indirect measure, resting heart rate, to assess aerobic fitness within mentally retarded adults.

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Thursday, April 16
4:15-4:30 p.m.

PSYCHOMOTOR TESTING IN THE SEVERELY MENTALLY RETARDED: MODALITY EFFECTS.

Wendell Liemohn, University of Tennessee.

Trial-to-trial variability in performance has been one factor which has precluded substantive research efforts in psychomotor performance of the severely mentally retarded (SMR). Moreover, although the visual modality is predominantly used in programming for this population, tactile stimuli may have some advantages from an information processing perspective (Anwar, 1983). Rhythmic experience presents a unique means to explore responses to perceptual cues for rhythm provides the temporal basis for coordinated movement (Thelen, 1981). In a rhythmic-tapping task, Kolers and Brewster (1984) reported that non-handicapped adults monitored auditory stimuli more carefully than visual and tactile stimuli. Using a comparable rhythmic-tapping task with deaf children, we found that intertap intervals with tactile stimuli were judged more accurately than those with visual stimuli. The purpose of the present investigation with institutionalized SMR adults (N = 19) was to determine (a) their consistency of performance on a rhythmic-tapping task and (b) the effect of stimulus modality on their performance. The testing equipment included an AIM 65 microcomputer programmed to generate the stimuli and score the responses. The stimulus modalities were presented in counter-balanced order at 750 ms intervals; the modalities used were (a) visual (a 2-cm square light), (b) auditory (a beep emulator), and (c) tactile (a bone vibrator). One non-scored trial was followed by three scored trials for each modality; the *r*'s for the between trial comparisons ranged from .59 (visual) to .85 (tactile) (the *r*'s between trials 2-3 were .68, .80 and .85 for the visual, auditory and tactile modes, respectively). The score for each modality was the mean of the subject's intertap intervals for the three trials; the intertap intervals with the auditory and tactile stimuli were judged longer (and more accurately) than those with visual stimulus (*P*'s = .002 and .017, respectively). A significant difference was not seen between responses to the auditory and tactile modalities. This research (a) supports the reliability of a rhythmic-tapping task for examining psychomotor skill in SMR adults and (b) suggests that further research efforts consider use of the auditory and/or tactile stimulus modalities for this population.

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Thursday, April 16
4:30-4:45 p.m.

NUTRITIONAL PROFILES OF WHEELCHAIR ATHLETES. Ron Davis, Kris Clark, University of Wisconsin-La Crosse.

The purpose of this investigation is to describe nutritional profiles of two groups of wheelchair athletes, road racers (RR) n=7, and basketball players (BB) n=16. The RR were participants in STRIDA Races held in conjunction with the 1985 NCAA III Track and Field Outdoor Championships at the University of Wisconsin-La Crosse, and the BB players were participants in the 1985 National Wheelchair Basketball Tournament in Chicago. Both groups completed a three day food intake survey, returned the surveys by mail for coding and computer analyzation. Caloric content and composition, and nutrient profiles were reported for each group by sex. Percentage of total calories over a three day intake were reported for four nutrients: protein, fat, carbohydrates, and iron. Recommended daily allowance (RDA) for iron in females is 18 mg, mean intake for iron in the female RR (n=3) was 13.2 mg, and 8.83 mg for the BB players (n=11). RDA for iron in males is 10 mg, a result of this study indicated male RR averaged 15.47 mg, while the male BB players reported 37.04 mg. RDA for carbohydrates is 50 - 70% of total daily calorie intake. Both groups of male athletes were below the RDA in carbohydrates; RR males 46.02% and BB males 36.48%. Both groups of female athletes reported slightly below RDA for carbohydrates; RR females 49.73% and BB 44.84%. Perhaps the most noticeable profile was that of fat in the diet for these athletes. Both groups reported high percentages of fat in their diets. RDA for fat is 20 - 30%; female RR reported 31% and BB 35.59%. Fat percentages for the male athletes in each group were: RR 31.85% and BB 39.28%. Implications for training should be apparent. The nutrient iron is vital in its use for oxygen mobilization within the human body and especially for female athletes. High fat diets are of little help to the athlete preparing for intense competition irregardless of being able-bodied or disabled. If the disabled athlete is concerned about training, proper nutrition is essential. In addition, those professionals involved with training a disabled athlete should monitor caloric intake closely. Poor nutritional preparation could have negative implications on the athlete's performance.

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Thursday, April 16
4:45-5:00 p.m.

RELIABILITY OF MAXIMAL GRADED EXERCISE TESTING OF MENTALLY RETARDED ADOLESCENTS AND ADULTS.

Bo Fernhall, Northern Illinois University; Lynn Millar, Austin, TX; Garth Tymeson, Northern Illinois University; Lee Burkett, Arizona State University.

Little data are available regarding maximal exercise testing of mentally retarded individuals. There are no data available on the reliability of maximal exercise testing of mentally retarded adolescents or adults. The purpose of this study was to determine the reliability of graded exercise testing for mentally retarded adolescents and adults. The testing was conducted at two different centers, in two different locations of the country. At center A, 13 (10 males, 3 females) Down's Syndrome adolescents (14-22 yrs. old; $\overline{x}$ wt = 62 kg) were recruited from a nonresidential school. The subjects completed two Balke & Ware treadmill protocols (speed = 3 mph; grade increased 2.5% every min) until exhaustion. The treadmill time and HR were recorded. A minimum of two days were allowed between tests. At center B, 14 (8 females, 6 males) mentally retarded adults were recruited ($\overline{x}$ IQ = 56; $\overline{x}$ age = 29.7 years; $\overline{x}$ wt = 71.6 kg). These subjects completed walking treadmill protocols starting at 3 mph and 0% grade. The speed was held constant, but the grade was increased 2.5% every min until exhaustion, following a 2 min warm-up. Metabolic data were collected in one min increments with a Beckman MCC cart. A minimum of one week was allowed between tests. At center A, the subjects achieved a $\overline{x}$ treadmill time of 8.72 min on test 1 and 8.84 min on test 2 ($\overline{x}$ HR = 175 bpm and 174 bpm respectively). The reliability coefficient between the two treadmill times was $r = .94$ ($r^2 = 88.4\%$). At center B, the subjects achieved a $\overline{x}$ VO_2 max of 26.7 $ml \cdot kg \cdot min^{-1}$ on test 1 and 26.9 $ml \cdot kg^{-1} \cdot min^{-1}$ on test 2. The test-retest reliability coefficient between the tests was $r = .92$ ($r^2 = 84.6\%$). These data show that maximal exercise testing is reliable for these populations of mentally retarded individuals. Further strengthening this conclusion is the fact that the testing was conducted at two different centers in the country, evaluating two different criteria for maximal work capacity. In addition, the data show that subjects from both centers were severely deconditioned which has been shown previously, but the current data support the validity of those findings.

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Thursday, April 16
5:00-5:15 p.m.

A COMPARISON OF "ISOLATE" AND "SOCIAL" TOYS ON THE PLAY BEHAVIORS OF HANDICAPPED PRESCHOOLERS. Carol Torrey, University of New Orleans; Jo Cowden, University of New Orleans.

The play behaviors of handicapped preschool children were video taped in an Adapted Physical Education class to determine the relationship between a child's gross and fine motor abilities and the child's preference for "isolate" or "social" toys. Fine and gross motor ability was indicated by individual test scores on the Learning Accomplishment Profile. An additional purpose of the study was to examine the level of social versus nonsocial play behavior according to Parten's Scale of Social Behavior. A total of twenty-four handicapped preschool children were involved in the study. Groups of 4-6 children were involved in three, twenty minute free play sessions, in which spontaneous, unguided interactions with the toys and interactions between children were video taped. In accordance with research findings from typical preschool children, a free play environment composed of "isolate" and "social" toys was established. Interval recording was utilized by two independent observers to rate the child's behavior. At the end of each 1 minute interval, each child's level of social play and toy preference was determined. Interrater reliability between the two observers was calculated to be at 95%. Data obtained in this study indicated that a significant relationship between motor ability and type of toy was not evident in the preschoolers. Results did indicate however, that the children involved in this study preferred "social" toys rather than "isolate" toys and interacted with "social" toys during 67% of the intervals in which play occurred. Although many of the children exhibited vestibular, balance, and locomotor deficits, tricycles, and other riding toys were the most highly preferred toys, while toy animals were least preferred. The handicapped preschoolers preferred the socialibility afforded by the riding toys and the other "social" toys, even though they did not have the skills necessary for social play. Results indicated that the children were involved in the three levels of nonsocial play (unoccupied, onlooker, or solitary) during 83% of their free, unstructured play. Although the handicapped preschoolers played with "social" toys, their play patterns involved solitary or onlooker play, rather than parallel, associative, or cooperative play. This study provides implications for establishing free play environments in preschool settings, to facilitate attainment of desired goals and objectives for handicapped children.

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Thursday, April 16
5:15-5:30 p.m.

PETTICOAT PIONEERS: ATHLETIC ADVANCES FOR WOMEN IN VICTORIAN AND EDWARDIAN NEW ZEALAND.

Scott A.G.M. Crawford, George Mason University.

Women in Colonial New Zealand did not have the variety of recreational options available in the 'motherland'(Great Britain). Nevertheless, there was a social climate of acceptance if not for the female athlete then certainly for the woman eager to enjoy the fun and freedom of recreational activities. In New Zealand the social class divisions of England were not replicated to the same degree. Moreover, New Zealand sport never became a 'self-indulgent festival of masculinity'. Recent studies of the sub-culture of mountain climbing and the development of women's team sports support the view that New Zealand women were 'petticoat pioneers', and that their athletic advances were part of a gradual movement within society for women's rights. While basic methodologies such as oral history and primary investigation of 'popular magazines' are discussed, attention is drawn to the rich potential of documentary archival material in radio, photography and early film.

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Friday, April 17
9:00-9:15 a.m.

BREAKING THE COLOR BARRIER IN BIG TEN BASKETBALL, Mary L. Remley, Indiana University.

The signing of Jackie Robinson with the Brooklyn Dodgers baseball team in 1947 has been heralded as "the most important event in desegregating sport in America." Surely, Robinson's joining a major league team and his subsequent success with the Dodgers had great impact in the world of sport, particularly professional sport; however, successes of other Blacks were similarly influential in the integration of sport at other levels. William L. (Bill) Garrett, for example, has been called the Jackie Robinson of Big Ten basketball, for it was he who joined Coach Branch McCracken's Indiana University team in 1947 as the first Black basketball player in the Conference. Both football and track in the Big Ten already carried Black athletes on their rosters; why not basketball? Garrett was highly successful as a high school athlete at Shelbyville claiming Indiana's highest honor, "Mr. Basketball," at the close of the 1947 season. How important was the recruitment of a player such as Garrett, whose athletic success seemed to be virtually assured, in the transition from segregation to integration in Big Ten basketball? Was there a benefactor for Garrett as Branch Rickey was for Robinson who was instrumental in the integration process, and what role did he play? What was the response of other Big Ten members to a Black player in the Conference? Utilizing several primary sources (Indiana University archives; newspapers; personal interviews with, among others, Garrett family members, the University Chancellor during Garrett's years as a student, and Athletic Division personnel of the time; and historical records of the Big Ten Conference) this paper examines Garrett's collegiate athletic career and analyzes his role in the successful desegregation of Big Ten basketball.

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Friday, April 17
9:15-9:30 a.m.

THE NATIONAL CONSORTIUM ON PHYSICAL EDUCATION AND RECREATION FOR THE HANDICAPPED AND ITS PREDECESSOR: HISTORY AND CONTRIBUTIONS. Claudine Sherrill, Texas Woman's University.

The purpose was to record the history of the National Consortium on Physical Education and Recreation for the Handicapped (NCPERH), which was founded in 1975, and of its predecessor, the Ad Hoc Committee on Physical Education and Recreation for the Handicapped, organized in 1973. A second purpose was to analyze the contributions of NCPERH to the evolution of the adapted physical education and therapeutic recreation professions and to the federal funding of training and research in these areas. This research was based on a review of minutes of meetings from 1973-1985; of the NCPERH Newsletter, printed quarterly from fall, 1975, to winter, 1985; of final reports of NCPERH presidents and committee chairs, and of correspondence included in the files of the organization. Data were collected also through telephone and personal interviews. Analysis of the data supported several hypotheses. Among these were (a) NCPERH has provided the framework for advocacy activities resulting in the allocation of over $22 billion to PE-R training by the federal government; (b) NCPERH has played a critical role in implementation of PL 94-142 and other EHA legislation; (c) NCPERH has contributed to expanding PE-R theory to include law, litigation, and advocacy; and (d) NCPERH has created a sense of community among university-based adapted physical educators and therapeutic recreators.

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Friday, April 17
9:30-9:45 a.m.

ANTE-BELLUM MANLINESS AND AMERICAN ATTITUDES TOWARD PHYSICAL CULTURE.

Susan G. Zieff, University of California, Berkeley.

Studies which have investigated relationships among "manliness," physical culture, and the rise of sport in ante-bellum America have been few in number in comparison with those which have examined similar conjunctions in Victorian England. This study examines ideas and ideals regarding what it was to be "manly" in ante-bellum America. The focus is upon the shared ideologies which emanated from those whom George Frederickson has called "New England intellectuals." In the decades between 1830 and 1860, American conceptions of "manliness," as defined by influential (and some not so influential), educators, physicians, ministers, social critics, and others shifted from an emphasis on the man who was "useful" and devoted to "community service," to one which included concerns about the development of the body with an attendant encouragement of physical training. E. Anthony Rotundo's work on American middle-class manhood has pointed to some of these transformations. The evolution of the ideology was accelerated by the transition from Calvinism, which emphasized human depravity and predestination, to a more liberal Unitarianism which fostered the possibility of perfectability of the individual. Advice literature and guide-books written by physicians and health reformers, articles in educational journals such as The Massachusetts Teacher, and literary journals such as The American Quarterly Observer, linked physical development with moral perfection. And both were required for total self-improvement. In addition to works such as Oliver Wendell Holmes' The Autocrat of the Breakfast Table and Thomas Wentworth Higginson's "Barbarism and Civilization," (which have now received attention from historians), authors like the Unitarian minister A. A. Livermore argued that an American emphasis on the intellectual, to the neglect of the physical, was leading to the deterioration of the American (i.e. Anglo-Saxon) race. The Congregationalist minister Henry Ward Beecher reminded young men that they had an obligation to God to respect and preserve their bodies. It is significant that these concerns found expression in such a wide range of general contemporary sources (e.g. educational, medical, religious, health reform, literary), as well as in an increasing number of publications as The Journal of Health and Gunn's New Family Physician. By 1861, participation in gymnastics, outdoor exercises, and even certain sports (e.g. baseball), in addition to systematic physical training, had been increasingly advocated for the development of "manly" American men.

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Friday, April 17
9:45-10:00 a.m.

CRITERIA UNDERLYING PERCEIVED SUCCESS/FAILURE AMONG CHILDREN WITH DIFFERENT PRE-GAME GOALS. Joan L. Duda, Purdue University

Recent research (Spink & Roberts, 1980, Roberts & Duda, 1984) has demonstrated that subjective success/failure in a sport setting is not always equated to sport outcomes such as winning and losing. Two critical distinctions between subjective goals are whether the goals are based on social comparison or mastery criteria, and oriented to individual or team performance (Duda, 1981, 1986). The purpose of this study was to determine the criteria predicting post-game perceptions of success/failure among young athletes with diverse pre-game goals. The subjects were 217 Japanese-American males and females (8 - 13 years of age) who participated in a community basketball league in a large metropolitan city. Immediately before a season game, subjects anonymously filled out a questionnaire which examined their subjective goal for the game. The specific pre-game goals examined were: 1) to win the game, 2) to try one's best in the game and improve one's basketball skills, and 3) to have the team play well together. Immediately following the game, subjects responded to a questionnaire determining their perceptions of goal attainment (i.e., subjective success/failure) and satisfaction with individual/team game performance. Multiple regression analyses were utilized to determine whether subjects emphasizing each of the three pre-game goals differed in the post-game variables (i.e., game outcome, satisfaction with own performance, satisfaction with team performance) significantly predicting perceived goal attainment. Game outcome (win/loss) was significantly related to success/failure among athletes whose goal was to win the game. Personal performance satisfaction was the best predictor of perceived goal attainment among those children emphasizing trying one's best and improving skills. Among those children whose pre-game goal was oriented to team play, perceived goal attainment was linked to satisfaction with team performance. These findings suggest that athletes with different motivational perspectives are processing the sport experience in different ways. By understanding how athletes with different goals think about their game experience, more insight into variations in sport behavior and the means to enhance perceptions of success and competence should be gained.

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Friday, April 17
1:00-1:15 p.m.

ESTABLISHMENT OF THE PSYCHOMETRIC PROPERTIES OF THE PRECOMPETITIVE STRESS STRESS INVENTORY: PHASE II. John M. Silva, C.J. Hardy, R.K. Crace, N.E. Slocum, Department of Physical Education, The University of North Carolina, Chapel Hill, N.C. 27514

Previous research with 294 youth sport participants has resulted in the establishment of initial psychometric properties for the PSI. The current study extends this psychometric research by refining the factor structure of the PSI and establishing preliminary data for concurrent and predictive validity of the PSI and demonstrating the internal consistency of the PSI. Subjects for the present study were 123 (females=45; males=78) youth sport participants (age 12-18; experience 1-13 years). All subjects signed an informed consent and were administered the PSI in small groups following a standardized instructional set. Subjects were asked to indicate how stressful they perceived each of the items during the inclusive time period 24 hours pregame. Content validity was established by a panel of experts from sport psychology and clinical psychology. Principal components factor analysis with varimax rotation and extraction restricted to 25 factors was conducted to examine construct validity. The statistical model accounted for 75.82% of the total variance and generated 14 interpretable factors each with an eigen value >1. In order to determine the factor structure consistency of the PSI from Phase I to Phase II a second factor analysis was performed on the 7 factors that emerged from both studies. The resultant statistical model accounted for 47.50% of the total variance with the factors and the percent variance contributing to the explained variance as follows: Group Motivation (21.13); Self Confidence (15.56); Performance Achievement (13.87); Guilt/Fear of Misfortune (13.30); Playing Time (12.97); Material Rewards (11.68); Family Involvement (11.45). Predictive validity was examined by regressing SCAT on factor scores generated by the 7 factor model. The results revealed a significant model ($F_{7,115}=14.86$, $p<.0001$, $R^2=47.49\%$)suggesting preliminary support for the predictive utility of the PSI. Concurrent validity was evaluated by correlating the PSI total scale score based on items that loaded on the 7 factors with SCAT. A significant correlation ($r=.5563$, $p<.0001$, $R^2=31.0\%$) was found indicating initial concurrent validity for the PSI. Item analysis was examined by correlating each PSI item that loaded with the total PSI scale score. Correlations ranged from .39032 to .68446, in addition coefficient alfa was computed at .9765. Both measures indicate support for the internal consistency of the PSI.

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Friday, April 17
1:15-1:30 p.m.

ATTITUDE ASSESSMENT AND TERM VARIATION IN PHYSICAL EDUCATION.

A. Brian Nielsen, University of Alberta; Laura L. Borsdorf, Ursinus College; Charles B. Corbin, Arizona State University.

Since attitudes are "non observable dispositions" (Kenyon, 1968) it is not surprising that their assessment is difficult. Among the methodological concerns cited by Albinson (1975) and others is the lack of consistency in use of terms as attitude objects between, and even within, attitude inventories in sport and physical education. The purpose of this study was to determine if two commonly used, and often interchanged, terms would elicit different responses when utilized in an otherwise identical attitude assessment instrument. The terms were "exercise" and "physical activity". A second purpose was to determine if a significant relationship existed between activity level and differential perceptions between the terms. Subjects (N=404) were classified as highly active (n=200) or moderately active (n=204) based on self-reports and choice of program enrollment at a Canadian University. Subjects completed one of two versions of a reliable (Nielsen & Corbin, 1986) instrument, the Commitment to Physical Activity Scale (CPA). The two forms of the scale were identical except that one form employed the term "exercise" as the attitude object while the other form used the term "physical activity". Inventory scores provided the dependent variable. A 2x2x2 ANOVA (sex x term x activity level) did not yield a three-way interaction. However a significant ($p<.001$) two way interaction did exist between activity involvement and stimuli term, with the less active group differentiating much more between the terms used than the active group. "Exercise" was perceived by all groups as less positive than "physical activity", but especially so among less committed and involved subjects. This finding, in conjunction with previous research (Borsdorf, Nielsen & Corbin, 1985) supports the notion that the use of different terms can elicit different attitudinal responses, especially among "lay" or "normal" populations. Certainly the intermixing of such terms on assessment inventories should be done carefully, if at all, and the use of various terms with the "public" should be judiciously considered.

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Friday, April 17
1:30-1:45 p.m.

ATTITUDES TOWARD PHYSICAL ACTIVITY OF COLLEGE STUDENTS.Marilyn Mowatt, Washington State Universtiy;Karen P. DePauw,Washington State University.

The purpose of the study was to investigate differences in attitudes toward physical activity among college students enrolled in physical education activity (PEACT) classes at a major universtiy in the Northwest U.S. during the spring of 1986. This study was undertaken in colloboration with a Western States regional association. A 20-item attitude assessment inventory was administered to 564 college students in twenty physical education activity classes. Classes of the same activity (conditioning, racquetball, soccer, swim conditioning, social dance, volleyball, weight training) were randomly assigned to an experimental or control group. The experimental group received mini-lectures on the scientific bases for physical activity in addition to the regular instruction. The attitude assessment inventory was administered during the first two weeks of the semester and again during the last two weeks of the semester. Data were collected and analyzed by gender, year in school, activity, experimental treatment (lecture/no lecture), and time. Upon the recommendation of statisticians, differences were tested by the Analysis of Variance technique (ANOVA) and post hoc Tukey tests. Significant among the findings were: (a) on the average, females exhibited more positive attitudes towards physical activity than did males, (b) attitudes toward physical activity did change over the course of the experimental period, (c) the use of mini-lectures was primarily effective in changing attitudes in those classes in which fitness/conditioning was emphasized, (d) college students exhibited general agreement that there is a scientific basis for the value of physical activity, (e) college students expressed neutral attitudes towards the importance of physical education in public schools, and (f) most college students indicated that it was important to be fit and that differences in attitude toward physical activity found to exist among college students were influenced by gender, year in school, activity course, lecture/no lecture, and the passage of time.

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Friday, April 17
1:45-2:00 p.m.

RATINGS OF PERCEIVED EXERTION AS A BASIS OF EXERCISE PRESCRIPTION IN POSTMENOPAUSAL FEMALES, AGED 50-70 YEARS.

J. Ballard, B. Tirey, B. McKeown, S. Zinkgraf; The University of Texas at Tyler.

Females become more prone to cardiovascular disease (i.e., hypertension, ischemic heart disease) after menopause and are often treated with Beta Blocking Medications. On these medications, HR is not a good indication of exercise intensity and prescriptions are often based on the Borg Scale (Ratings of Perceived Exertion, RPE). Postmenopausal (PM) females, however, have not been studied with regard to this scale. The purpose of this study was to evaluate the effectiveness of PM females, aged 50-70 years, in using RPE to estimate exercise intensity as determined by HRs during a treadmill (TM) test. Eighty-four females who were not on cardiovascular medication completed a sub-maximal (85% of age determined HR) Balke TM test. During TM test, HR was measured each min and RPE during the last 15 secs of even mins. $\overline{X}$s, SDs, △Diff Scores (computed by multiplying RPE by 10 and subtracting from HR obtained), and zero-order "r"s are given by age groups (50-59 yrs, $\overline{X}$ age=54.3±3.1; 60-70 yrs, $\overline{X}$ age=63.7±3.1) for the even mins of the TM test.

Variables	Min 2	Min 4	Min 6	Min 8	Min 10
(50-59 yrs)					
n	56	56	56	54	38
HR bpm	103.0±13.4	107.7±12.8	115.6±13.1	125.0±12.5	132.2±10.9
RPE	9.0± 1.7	10.0± 1.8	11.5± 1.5	12.5± 1.6	13.4± 1.1
△Diff	13.9±17.3	7.6±16.8	.8±17.9	.3±18.5	-1.4±16.0
r	.37*	.43*	.22*	.26*	.02
(60-70 yrs)					
n	28	26	23	19	9
HR bpm	108.5±16.6	111.5± 6.2	117.3±15.3	125.2±15.7	130.1±14.6
RPE	10.3± 1.5	11.1± 1.9	12.7± 2.0	13.8± 2.0	14.1± 2.0
△Diff	7.6±22.5	-.9±19.5	-7.6±20.9	-13.2±20.0	-8.6±22.6
r	.12	.36	.26	.28	.23

Based on the smaller △Diff Scores and the significant "r"s* ($p < .05$), younger Ss were more accurate in estimating HR with RPE than were the older Ss but there was wide variability among Ss in both groups in using this scale (SD of △Diff Scores). The younger Ss tended to underestimate HR (positive △Diff Scores) and the older Ss to overestimate HR (negative △Diff Scores). It was concluded that : 1) accuracy in using the Borg Scale decreased with age, and 2) individuals varied in their ability to use this scale. Thus, care should be taken when using this scale in PM females as a basis for exercise prescriptions.

Supported by The University of Texas at Tyler FRC Grant #86.

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Friday, April 17
2:00-2:15 p.m.

PARTICIPANT REACTIONS TO AN EXERCISE PROGRAM FOR OVERWEIGHT WOMEN.

Linda L. Bain, University of Houston; Timothy Wilson, University of Houston; Ellie Chaikind, Westoaks Counseling Center.

Overweight is increasingly prevalent in American society and is particularly a concern among women. Although debate continues about the health risks of overweight compared with those associated with dieting (Harvard Medical Newsletter, 1986), most agree that increased exercise has health benefits for the overweight. However, overweight women do not join exercise programs or disproportionately drop out once enrolled. In order to make exercise programs more effective for this population, we need to understand aspects of the program that encourage or discourage participation. The purpose of this study was to examine the reactions of overweight women to a series of exercise sessions.

Overweight women were invited to participate in a research project involving two phases: (1) an interview regarding weight history and exercise patterns, and (2) a series of exercise sessions followed by discussions of participants' reactions to the experiences. This paper reports the results of phase two of the project.

Eighteen subjects ranging in age from 25 to 61 participated in five weekly sessions consisting of one hour of activity and instruction followed by one hour of discussion. Teaching responsibilities were shared by three physical educators with varied backgrounds and teaching styles. Two researchers served as participant-observers and led the discussions. Subjects also kept a journal recording all participation in physical activity and their reactions to these experiences.

The data were analyzed using both inductive analysis techniques and constant comparison methods. Triangulation was accomplished by the use of multiple data sources and the involvement of multiple investigators in the analysis of the data. Results of the analysis were discussed with participants to provide for collaborative validation of the interpretation.

Four themes emerged from the analysis of the data: (1) Personal competence: reactions varied based on subjects' perceived physical ability; (2) Social risk: perceptions of the situation as stigmatizing or non-judgemental had an important influence; (3) Physical risk: subjects reacted to potential danger or discomfort; (4) Perceived benefits: reactions depended upon perceived benefits that were compatible with personal goals. Implications for the design and conduct of exercise programs for overweight women are discussed.

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Tuesday, April 14
9:00-10:15 a.m.

RANKED IMPORTANCE OF STUDENT TEACHER TASKS AS PERCEIVED BY COOPERATING TEACHERS AND UNIVERSITY SUPERVISORS. Debra S. Berkey and Michelle L. Hamilton, Western Michigan University.

Frequently, the expectations of the cooperating teacher and the the university supervisor vary with respect to the importance of the tasks performed during student teaching (Andrews, 1976). Doyle (1979) defines a task as an explicit or implicit set of requirements specifying what an individual must do to successfully cope with a given environment. The purpose of this study was to determine the ranked importance of teaching tasks to be demonstrated during the student teaching experience as perceived by active cooperating teachers and supervisors within the field of physical education. Questionnaires were sent to cooperating teachers ($n = 91$) and university supervisors ($n = 30$) randomly selected from seven universities within one mid-western state during the winter semester, 1986. The overall rate of return totalled 70 percent ($n = 85$). Subjects were asked to rank the importance of 15 teaching tasks with respect to their expectations of student teachers. Independent t-tests were performed on the mean ranks assigned by the study groups. Statistically significant differences ($p. > .05$) were indicated on the tasks of self-assessment, writing lesson and unit plans, selection of activities based on learner needs, demonstration of the knowledge of learner characteristics, effective management of inappropriate student behavior and the provision of appropriate activities in a safe environment. An analysis of variance was performed to detect differences among the ranked tasks in relationship to age, gender, experience and highest degree earned. No differences were indicated. Though the sample size is limited and the results of this study must be interpreted cautiously, it appears that the expectations of the cooperating teacher are centered on the control and safety of their students. Planning skills, the ability to self-assess, and knowledge of learner characteristics do not seem to be valued by this group. Conversely, the failure of the university supervisors to identify the variables of safety and effective behavior management indicates that these variables are of little interest to this group. If, as Tinning and Siedentop (1985) indicate, monitoring and feedback by the cooperating teacher and university supervisor play an important role in the performance of the student teacher, this research study indicates that clearer definitions of tasks expected of student teachers must be developed. Tasks must not only be defined but mutually agreed upon by the supervisory team to enhance preparation program effectiveness.

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Tuesday, April 14
9:00-10:15 a.m.

AN EXAMINATION OF THE EFFECTS OF SELECTED COMPONENTS ON PHYSICAL EDUCATION TEACHER EDUCATION PROGRAMS AS PERCEIVED BY PHYSICAL EDUCATION TEACHER EDUCATION FACULTY.

Harvey R. White, University of North Dakota; Jacalyn Brunelli, Ft. Morgan High School, Co.

The intent of this investigation was to examine the effects of selected components as perceived by physical education teacher education (PETE) faculty on PETE programs. The selected components examined were: 1) prior teaching experiences of PETE faculty, 2) theoretical-practical approach in teaching PETE subject matter, and 3) other activities/subject areas identified by PETE faculty as most and least useful in teacher education programs. Seventy-nine PETE faculty from colleges/universities with teacher education programs provided data for analysis. Most PETE faculty had prior teaching experiences at a level, kindergarten through secondary (K-12). Seventy-five percent of the respondents had prior teaching experience at the secondary level. PETE faculty (75%) indicated their own teaching effectiveness would improve if they were to return to the K-12 level to teach. Only 38% indicated such an experience should be mandated. Eighty-four percent of the faculty expressed a concern that prior teaching experience at the levels on which PETE faculty were preparing individuals to teach should be required. Subjects identified as being more effectively taught in PETE programs, if faculty had prior teaching experience at the K-12 level, were classroom management, analysis/evaluation of sport skill and motor development. PETE faculty identified subject areas best taught from a theoretical approach as those being science based; whereas, non-science based subjects were taught more effectively from a practical approach. The three subject areas ranked highest to lowest respectively by PETE faculty as being more effectively taught from a theoretical approach were sport psychology, growth/development and exercise physiology. Those subjects identified that could be taught more effectively from a practical approach consisted of analysis/evaluation of sport skill, classroom management and fitness testing. Test and measurement and motor development were identified as being taught more effectively from a combination of theoretical and practical approaches. Faculty identified education courses outside the major as being the least useful component in PETE programs. Internships, early in the PETE program, and student teaching were identified as being the most useful components in preparing individuals to teach. Evidence generated in this investigation should give greater insight to the organization and techniques used in developing effective PETE programs.

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Tuesday, April 14
9:00-10:15 a.m.

A DESCRIPTIVE ANALYSIS OF TEACHER VERBAL BEHAVIOR IN ELEMENTARY PHYSICAL EDUCATION. Clara Y. Cook, Florida State University; Lynda E. Randall, Florida State University.

The purpose of this study was to describe the nature of teacher verbal behavior in elementary physical education. The analysis of teacher verbal behavior can yield important information about the ecology of the learning environment. By examining the nature of instructional input; skill feedback; and social feedback, it is possible to compare the distribution of these behaviors to what might be prescribed by motor learning and pedagogical research. The literature indicates that young learners can benefit from general information that is relevant to the task. Provision of high rates of input and specific corrective skill feedback may inhibit acquisition of motor skills. In addition, high rates of corrective social behavior feedback can contribute to a negative classroom climate. This investigation was designed to provide a comparison of theory and practice through observation of classes taught by elementary physical education specialists. A total of 32 classes (Grades K=7, 1=6, 2=5, 3 =6, 4=5, 5=3) were observed for an average duration of 30 minutes. The Dodds (1984) STOP instrument was used to systematically observe and classify the behaviors as instructional input, skill feedback, or social behavior feedback. Feedback statements were subdivided according to the valence (positive, corrective, negative) and precision (specific, general). A total of 2,016 verbal behaviors were observed. Of this total 897 (44.6%) were input behaviors; 826 (41.0%) were skill feedback; and 293 (14.5%) were social behavior feedback. The greatest incidence of skill feedback behaviors was observed for the categories of positive-general (50.0%) and corrective-specific (40.2%). The remaining skill feedback statements were distributed as follows: (positive-specific = 9.0%, corrective-general = .6%, negative-specific = .0%, negative-general = .2%). Social behavior feedback behavior were heavily distributed toward corrective-specific (77.4%). The remaining social feedback behaviors were observed as follows: positive-specific = 15.5%, positive-general = 1.0%, corrective-general = 4.4%, negative-specific = .7%, negative-general = 1.0%). In summary, the observed teachers directed most of their verbal behaviors toward providing input and skill behavior feedback. In addition, most of the observed social behavior feedback was corrective. The high rates of instructional input, specific-corrective skill feedback, and corrective-specific social behavior feedback are not conducive to an optimal learning environment. There is a need to focus greater attention on the provision of skill feedback that is general in nature, and positive social behavior feedback or praise.

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Tuesday, April 14
9:00-10:15 a.m.

THE EFFECTS OF PEER FEEDBACK ON TEACHING BEHAVIORS OF PHYSICAL EDUCATION STUDENT TEACHERS.

Nell Faucette, San Diego State University; Brent S. Rushall, San Diego State University.

A widespread concern in higher education today is the quality of teacher training programs. It has been recognized that new teachers need better training to be more effective teachers. One initial area of teacher training receiving attention is the upgrading of the student teaching experience. The purpose of this study was to evaluate effects of systematic behavioral feedback supplied by peers on teaching behaviors of student physical education teachers. Six student teachers of physical education from San Diego State University served as subjects. They were stationed at three different senior high schools as three pairs. All subjects were enrolled in their final teacher training experience in the university's teacher credential program. The principal method for obtaining rates of occurrence of teaching behaviors was the Teacher Observation Schedule (TOS) (Rushall, 1977). Instructional sessions were evaluated by the observing peer using this momentary time-sampling observation procedure. Periodic co-observer assessments were made to evaluate observer reliability. To evaluate effects of the experimental manipulation, a multiple-baseline intrasubject design was replicated across the three school environments. During baseline, subjects were observed one class of instruction per day by a peer but not provided any feedback. Observations continued until the behavior rates had stabilized. The experimental variable introduced was feedback about teaching behaviors provided by peers. This stage continued until behavior rates stabilized. Baseline conditions were reintroduced to determine the effectiveness of the experimental manipulation for producing a lasting change. The data revealed changes in the student teachers' behaviors during the experimental treatment. During the second baseline condition when feedback was removed some regression was evident but not to the original baseline levels. Therefore, the experimental variable appeared to be a viable procedure for implementation into the student teachers' training program.

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Tuesday, April 14
9:00-10:15 a.m.

PERCEPTUAL STYLE, VISUAL RETENTION & VISUAL DISCRIMINATION IN THE QUALITATIVE SPORT SKILL ANALYSIS PROCESS. Sandy Gangstead, Oklahoma State University; Christine Cashel, Oklahoma State University; Sandy Beveridge, University of Utah.

The purpose of this study was to determine the relationship of perceptual style (Field Independence-Field Dependence) to performance of two observational tasks deemed important to qualitative sport skill analytical competence, visual discrimination and visual retention of selected motor patterns. 124 undergraduates were randomly selected and particiapated in the study. Visual discrimination and visual retention were assessed utilizing the respective subtests of the Utah Sport Skill Analysis Test II, a format which consisted of videotaped performances of selected sport skills and required subjects to indicate the presence or absence of specific movement phenomenon. Subjects' characteristic mode of perception was determined through standard assessment using the Witkin Rod and Frame Test with the standard dark room apparatus (Marietta Mode 18-10), Total absolute error scores across 8 randomly ordered rod and frame settings for each subject were recorded. A moderately low, but statistically significant, Pearson Product Moment Correlation Coefficient, $r = -.27$ ($p < .05$) was noted when data was analyzed between the perceptual task and the visual retention task. A significant relationship was noted, $r = -.34$ ($p < .01$) between the perceptual task and the visual discrimination task. Subjects were categorized into either field independent or field dependent groups. T-tests conducted on visual retention data revealed no significant difference between groups. However, a significant difference between group means was noted ($p < .05$) on the visual discrimination task. It was concluded a) perceptual style may influence the ability to observe and remember critical features of sport skill performance and, b) subjects exhibiting strong field independent style preference tend to perform more effectively on sport skill analysis tasks requiring visual discrimination ability than those exhibiting strong field dependent style preference.

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Tuesday, April 14
9:00-10:15 a.m.

RESEARCH ON TEACHING: EXPANDING THE VIEW. Kathy Graham, The University of Alabama.

The purpose of this study was to identify factors that supported and constrained students' motor skill performance during a 14-lesson middle school volleyball unit using a social interaction perspective of analysis. Grounded in a social interaction perspective, research questions focused on the organizational, social, and academic structure of lessons. Data collection consisted of making audio and videotaped records of lessons, from which data were extracted to answer the research questions. The analytic process involved the search for, and identification of, recurring patterns of action and interaction in the physical education class. This process was microanalysis and macroanalysis of the instructional conversation and students' participation in physical activity (Graham, 1986; Green & Wallat, 1981). Variables grounded in the observed patterns were constructed and tested within/across lessons using the type case analytic approach (Erickson & Shultz, 1981). Then, indepth analysis of students' actions and behaviors was conducted in order to assess the influence of a particular variable on students' motor skill performance. Results relative to the academic structure of lessons included the identification of task presentation as a complex instructional activity in which the teacher communicated information primarily, but not entirely, about academic work. Thirteen categories of information were identified that were selectively used by the teacher during lessons to communicate information about practice. Results from the analysis of students' actions and behaviors showed that the communication of information regarding academic work was done effectively: Students listened to the teacher, they understood the expectations for practice, and they engaged appropriately in practice. The findings on task presentation revealed a picture of the complexity of communication in the physical education class that has largely been ignored in past work. These findings suggest the need to continue to explore task presentation as a factor related to effective instruction. Finally, the findings suggest that improvements in the theoretical and methodological conceptions of effectiveness can increase understanding of complex managerial and instructional processes and their influence on students' motor skill performance.

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Tuesday, April 14
9:00-10:15 a.m.

PHYSICAL FITNESS RELATED ATTITUDES OF SECONDARY PHYSICAL EDUCATION TEACHERS IN THE UNITED STATES: REGIONAL DIFFERENCES.

David M. Koceja, Christopher J. Sodoma, Michael S. Willett and Wynn F. Updyke, Indiana University, Bloomington, IN 47405.

This investigation sought to examine certain fitness related attitudes of secondary physical education teachers throughout the United States. A 17-item questionnaire was included in the AAU Physical Fitness Test Brochure for 1985-86. This questionnaire included items concerning the educational background, program objectives and teacher attitudes toward physical fitness and coeducational classes. For the purposes of this investigation, the 143 teachers from the secondary schools in the national sample were subdivided into four discrete sections: East (E); South/Southeast (S); Midwest/Central (M) and West (W). For each question, a Chi-Square (X^2) Test of Independence was performed to detect whether significant differences existed between the proportion of respondents in each category for the different sections of the country. When a significant X^2 existed, the matrix was collapsed into 2 x 2 tables, to more precisely detect which sections differed. For all statistical tests, the .05 level of significance was used. When viewed as a single national group, the secondary physical educators expressed the following concerns: insufficient time and inadequate facilities. When examined by geographical region, the following were among the pertinent findings: 1) teachers in the E had more experience than those in the S, M or W ($X^2 = 14.51$); however, teachers in the E had less background in physical education; 2) no regional differences in educational attainment were observed ($X^2 = 4.03$; 3) no differences in program objectives were found ($X^2 = 7.62$); 4) insufficient time was the major concern in the E, M and W, while facilities was the major problem in the S ($X^2 = 8.20$); 5) a greater percentage of coaches was noted in the W and M ($X^2 = 15.28$); and 6) a greater proportion of E teachers thought that physical education should be coeducational ($X^2 = 16.17$). These results indicate that regional differences in attitudes and concerns do exist among physical educators.

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Tuesday, April 14
9:00-10:15 a.m.

THE EFFECTS OF THREE SYSTEMATIC OBSERVATION DATA COLLECTION PROCEDURES ON TEACHING BEHAVIORS OF COLLEGE PHYSICAL EDUCATION INSTRUCTORS. Alan C. Lacy and John A. Lollar, Texas Christian University.

The purpose of this study was to determine if the procedure used to collect systematic observation data had any effect on the behaviors exhibited by college instructors. Subjects were nine selected physical education instructors teaching in the activity program at Texas Christian University in the 1986 spring semester. The three data collection procedures were 1) behaviors coded by an observer watching the class, 2) behaviors recorded by a portable VCR camera and coded from the audio-video tape, and 3) behaviors recorded by a portable cassette recorder and microphone worn by the instructor and coded from the audio tape. An interval recording systematic observation instrument utilizing eleven specifically defined behavior categories modified from the Arizona State University Observation Instrument was used to code the behavioral data collected from each of the three procedures. The investigator coding the behaviors was trained in the use of interval recording procedures, and interobserver agreement checks exceeded the 85% agreement criterion needed to insure accuracy of the data. Each subject was observed three times during the semester with a different data collection procedure being used each time. Using the six possible combinations of implementing the data collection procedures, the order in which the three procedures were utilized was randomly assigned to each subject to help insure validity of the data. Behavioral data was collected for twenty minutes in each class, and no observations were made in the first three weeks or the last three weeks of the semester. The percentage of intervals that each behavior category was observed and coded for the group of subjects was calculated. An univariate analysis of variance (behavior by procedure) revealed no significant differences at the .05 level of confidence between the three data collection procedures for any of the eleven behavior categories. Each of the three data collection procedures utilized in this investigation has been employed in completed behavioral research. The results of this study support the assumption made in past research that the type of data collection procedure utilized does not affect the behaviors of the subject.

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Tuesday, April 14
9:00-10:15 a.m.

MOVEMENT AND BEHAVIOR PATTERNS OF IMPULSIVE AND REFLECTIVE CHILDREN IN THE GYMNASIUM: AN OBSERVATIONAL ANALYSIS. Amelia M. Lee, Dennis K. Landin, Katherine F. Hill, Karen Greenockle, Louisiana State University; Rosaland Edwards, University of Houston.

Laboratory studies provide consistent evidence in support of the notion that reflective students have an advantage in situations requiring attention, motor inhibition, problem solving and performance accuracy. Given recent arguments for ecological validity it is desirable to extend these laboratory findings to real-life settings such as the gymnasium. The purpose of this study was to examine the movement and behavior patterns of reflective and impulsive students in a self paced elementary movement environment. Students were 171 elementary students in a suburban school with one physical education teacher. Student data were grouped by cognitive style, grade level (primary and intermediate) and gender. Kagan's Matching Familiar Figures Test (MFFT) was used to identify cognitive style. A station learning organizational arrangement with age appropriate activities which allowed individual progression was used by the teacher. The students were videotaped during one lesson and several student process variables were recorded by trained observers. The data collection instrument was an electronic microprocessor capable of collecting duration (temporal percentage) and rate (frequency) on all behaviors. Duration categories (motor engaged, nonmotor engaged) and frequency categories (successful practice trials, unsuccessful practice trials, off task behaviors) were analyzed in a 2 (reflective, impulsive) x 2 (primary, intermediate) x 2 (male, female) MANOVA with appropriate follow-ups. A type of behavior in this context that emerged as significantly different for the reflective and impulsive groups was the frequency of off task episodes. Impulsive children were engaged in more activities unrelated to the goals of the lesson. None of the other behaviors distinguished reflective and impulsive children even though the means for successful and unsuccessful trials were in the expected direction. Age differences were also evident. Older subjects exhibited less off task behavior and fewer unsuccessful trials than the younger students. Results suggest that impulsive children exhibit less self control than reflective children in a self paced learning environment. There may be merit in teachers gaining a better understanding of the behavior patterns of students with different learning styles in a variety of environments.

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Tuesday, April 14
9:00-10:15 a.m.

A DESCRIPTIVE ANALYSIS OF COACH AUGMENTED FEEDBACK GIVEN TO HIGH SCHOOL VARSITY FEMALE VOLLEYBALL PLAYERS. Regina Markland, University of North Carolina at Greensboro; Thomas J. Martinek, University of North Carolina at Greensboro.

The purpose of the study was to examine the nature and amount of feedback that more and less successful high school varsity volleyball coaches gave to their starting and nonstarting volleyball players. Four coaches used as subjects. Two of the four coaches were considered more successful, and two considered less successful based on the previous season's regular season win-loss percentage. Players of all the coaches (N=41) were also used as subjects and identified as having either a starting or nonstarting role on the team.

All subjects were observed on three occasions for 30 minutes per observation during regular season practice sessions. The Cole Descriptive Analysis System (Cole-DAS) was used to observe coach augmented feedback (CAF) as it was given by each coach to individual players in response to skilled performance. The feedback was recorded into sixteen subcategories described by Cole-DAS.

Data collected from all observations were summarized and placed in tables which indicated feedback behaviors of all coaches combined and of each coach individually. Summaries were expressed as frequencies and percentages. A 2 x 2 multivariate analysis of variance was used to describe the effects of (a) success of the coach, (b) role of the player, and (c) both success of the coach and role of the player on the dependent variables of coach augmented feedback.

The following results were obtained from the data analysis:

1) The most frequently used CAF behaviors were audio, immediate terminal, corrective, and whole movement.

2) Players of more successful coaches received significantly more audio, immediate terminal, approval, corrective, whole movement, and part movement CAF than players of less successful ($p < .05$).

3) Starting players received significantly more audio, audio-visual, immediate terminal, whole movement, and part movement CAF than nonstarting players ($p < .05$).

4) Their were no statistically significant interaction effects among the independent variables, success of the coach and role of the player ($p < .05$).

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Tuesday, April 14
9:00-10:15 a.m.

CONFIRMATION OF A TEACHER EXPECTANCY MODEL: STUDENT PERCEPTIONS AND CAUSAL ATTRIBUTIONS OF TEACHING BEHAVIORS.

Thomas J. Martinek, University of North Carolina at Greensboro.

The intent of this study was to describe patterns of observed and student perceived teaching behaviors directed to high and low expectancy students and to determine how students attribute causes to the teaching behaviors. Eleven certified elementary classroom teachers and their second and third grade classes served as subjects for the study. Twenty-seven high expectancy and 33 low expectancy students were identified by having the teachers rate their students in terms of expected levels of performance for the school year. Three types of teacher feedback were recorded by trained observers: (a) praise/encouragement, (b) skill correction, and (c) behavior management. Students were also interviewed to see whether their perceptions of the teacher's actions was consistent with the coded dyadic interactions. In addition, interviewers asked the students to describe the causes for the teacher actions. Each cause was classified into one of four attributional categories: (a) personal causes, (b) teacher causes, (c) environmental causes, and (d) complex causes. Major differences between observed and perceived teacher praise and reprimand were found for high and low expectancy students. Attributional data also revealed that low expectancy students tended to attribute teacher reprimand to personal causes much more so than high expectancy students. High expectancy students, on the other hand, were more inclined to attribute reprimand to teacher characteristics.

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Tuesday, April 14
9:00-10:15 a.m.

THE EFFECTS OF A PHYSICAL EDUCATOR'S APPEARANCE OF BODY FATNESS HAS ON COMMUNICATING EXERCISE CONCEPTS TO HIGH SCHOOL STUDENTS.

D. Scott Melville, Eastern Washington University; John G. F. Maddalozzo, Iowa State University.

The purpose of this study was to determine if a male physical educator's appearance of body fatness effects his ability to teach and instill good exercise intentions in high school students. Eight hundred and fifty students viewed one of two, 20 minute videotapes in which exercise concepts were presented. The tapes were identical with the exception that in one, the instructor's body dimensions were altered by a "fat suit." Immediately upon seeing their tape, the students completed a content examination and questionnaire. t-test analysis revealed that the viewers of the overweight instructor tape scored lower on the examination ($p<.01$); exhibited a lesser intent to exercise ($p<.01$); and less favorably rated the teachers likability, expertise, and appropriateness as a role model ($p<.01$). Two x two (instructor appearance x student fitness level) ANOVA's were done on intent to exercise, liking of the instructor, appropriateness of instructor as a model, and knowledgeability of the instructor. No interactions were found ($p<.01$). It was concluded that a physical educator's appearance of body fatness may be a very powerful variable mediating teaching effectiveness. Further ideas for study in this area were suggested and possible implications for teacher education schools were made.

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Tuesday, April 14
9:00-10:15 a.m.

LESSON CONTENT, GRADE LEVEL, AND VARIABILITY IN PURPOSEFUL MOVEMENT RATES AMONG EXPERIENCED PHYSICAL EDUCATION TEACHERS.

Deborah H. Morgan and Robert P. Pangrazi, Department of Health and Physical Education, Arizona State University, Tempe, AZ, 85257

Purposeful movement is the first teacher-initiated verbal or nonverbal interaction with students in a quadrant of the teaching area. It has been suggested that increased purposeful movement may be related to a higher incidence of teacher feedback and student time-on-task. This study investigated the association of lesson content and grade level with the movement rates of five experienced elementary school physical education teachers. Five instructors (4 males and 1 female), with a mean teaching experience of 6.6 years, were observed for two or three consecutive classes on two occasions over a 5-week period. A total of 27 class periods (8 kindergarten, 9 first grade, and 10 second grade) were monitored. Observations were made during four lesson contents (balance beams, hoops, magic ropes, and scoops and balls). Purposeful movement data were collected using event recording techniques during the lesson content portion of each class session. Total number of purposeful moves was divided by lesson content time to obtain a mean purposeful movement rate of 3.36 moves/minute. Results of ANOVA revealed no significant differences in purposeful movement rates ($p>.05$) among experienced physical education teachers when grade level or lesson content varied. These data indicate that purposeful movement rates of experienced physical education teachers remained stable despite differences in grade level and lesson content.

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Tuesday, April 14
9:00-10:15 a.m.

An Experimental Teaching Unit With Inservice Teachers: A Follow-Up of A Six Year Longitudinal Study. Paul C. Paese, Southwest Texas State University, San Marcos, Texas.

Lawson (1982) and Locke (1984) both indicated that there was a need for longitudinal studies on student interns as they progress from teacher education through the different phases of teaching. Paese (1984) and Paese (1986) analyzed the differences between preservice interns with and without a pre-student teaching field experience during both student teaching and at the conclusion of the induction (3 years of teaching) phase. Major differences between the two groups existed on various teacher effectiveness variables in favor of the field experience interns during student teaching and again, but to a lesser extent after 3 years of teaching. The significance of this study is that it continued to assess former interns' teaching effectiveness after 5 years of teaching. The purpose of this study was as follows: 1) to assess if differences still exist between the two groups of teachers after 5 years of public school teaching, 2) to ascertain if teaching skills are maintained after 5 years of public school teaching and to assess the effect of teacher socialization. Subjects used in this study were 10 middle school physical education teachers who were part of the original 52 subjects used during the six year study. Each teacher was observed teaching an Experimental Teaching Unit (ETU). All teachers were observed teaching two 20 minute lessons pertaining to a novel skill. The Academic Learning Time Observation System (Siedentop, Tousignant & Parker, 1982) was used as the major instrument for data collection. The use of an ETU allowed the investigator to control most of the extraneous variables between teachers. The data were analyzed using both an independent and dependent t-test. After analyzing the data the only significant differences between groups were on Academic Learning Time-PE and percent of student engagement during activity ($P<.05$) in favor of the non-field experience teachers and specific feedback ($P<.01$) in favor of the field experience teachers. There were no significant differences between groups on pretest/posttest results. Students in the field experience teachers classes did make significant improvement from pretest to both posttests administered ($P<.05$). The non-field experience teachers students improved significantly from pretest to posttest ($P<.001$). The major conclusion generated from this study is that teaching skills can be maintained in schools after 5 years of teaching.

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Tuesday, April 14
9:00-10:15 a.m.

EXPERIENCED AND PRESERVICE TEACHER'S ABILITY TO DIAGNOSE LEARNING STYLE PREFERENCE Frank Pettigrew, Kent State University; Cathy Buell, Kent State University.

Cognitive, affective and physiological traits serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment. Learning style diagnosis is a primary component of the teaching-learning cycle, one which encourages an individualized educational approach and provides a powerful new tool to physical educators who want to improve student learning. The purpose of this study was to examine the ability of experienced and preservice teachers to diagnose learning style preferences of selected students. The subjects were 30 experienced elementary, junior and senior high school physical education teachers, 30 preservice, student teachers and 180 elementary, junior and senior high school students. All student teachers were completing the experience as required for state certification. The Canfield Learning Style Inventory was administered to all 180 randomly selected students in order to determine the students' learning style. The inventory identified three major categories under which students prefer to learn; Conditions, Content and Mode. Validity and reliability results for the Inventory have ranged from .64 to .95 and .86 to .96 respectfully. Each experienced and corresponding student teacher completed a Canfield Learning Style Inventory Profile assessment, identifying the teachers' perceptions of the selected students' learning style. The students were not identified to the teachers prior to the completion of the profile assessment. The relationship between teachers' perceived profile scores and the students' actual learning style scores was analyzed by developing a correlation matrix derived from the Pearson Product-Moment Correlation Coefficients. Results of the study indicated that a wide variety of learning styles existed within the 180 students. No specific category preference could be identified. Further analysis showed neither experienced teachers nor student teachers accurately diagnosed the learning styles of their students. Coefficients ranged from .20 to .60 for each of the categories. The implications of these results are twofold. First, due to the wide range of individual differences in learning styles, physical education students should be encouraged and provided experiences to develop an eclectic approach to teaching that may increase the accommodation of learning styles. Second, undergraduate preparation of physical educators should include guided experiences for recognizing, assessing and accommodating student learning styles as well as an introduction to the formal methods available for diagnosing styles.

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Tuesday, April 14
9:00-10:15 a.m.

AN ANALYSIS OF THE RELATIONSHIPS BETWEEN SELECTED TEACHER, COURSE, STUDENT CHARACTERISTICS AND STUDENT EVALUATIONS OF THEIR UNIVERSITY INSTRUCTORS. D. Allen Phillips, University of Northern Colorado; Cynthia Carlisle, University of Northern Colorado; Jeff Steffen, University of Northern Colorado; Sandra Stroot, University of Northern Colorado (Greeley).

The purpose of this study was to analyze the relationships between 6 teacher, 6 course and 9 student characteristics and student evaluations of their university instructors obtained from the Teacher Assessment Rating Scale (TARS). Data for teacher and course characteristics were collected from 88 volunteer University and College Physical Education instructors. Data for student characteristics and student evaluations were obtained from 1762 students. Zero order correlations were computed between the 21 teacher, course, and student characteristics and the student rating criterion which was determined by finding the average item score for all students of each teacher. The highest correlations were found between the criterion and student's perceptions of the teacher's independence and attractiveness (r=.62 and r=.38, respectively). A full model and six partial model multiple regression analyses were conducted. An R of .68 was found for the full model. The R's for the partial model ranged from .11 to .67. The R for the partial model between the student characteristics and the criterion was .66. Of the total variance accounted for in the regression analyses, almost all can be attributed to the student characteristics. Less than 4% of the variance was accounted for by the teacher and course characteristics combined. A stepwise regression analysis was conducted which added the predictors to the model in order based upon the variables contribution to the total variance. The variables added in descending order to the model were: perceived independence, perceived attractiveness, prior interests, expected grade, class status, student work load, perceived teacher fitness level, class size, instructor's age, and degree. The first seven variables added to the stepwise model were student characteristics and attributed all but one percent of the accountable variance.

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Tuesday, April 14
9:00-10:15 a.m.

THE EFFECT OF A PLANNING INTERVENTION ON VERBAL BEHAVIOR OF PRESERVICE TEACHERS IN A MICROTEACHING EPISODE. Lynda E. Randall, Florida State University; Charles H. Imwold, Florida State University; Bryan Briddell, Skidmore College; Robyn Hines, Florida State University.

This study was conducted to determine the effect of a specified lesson plan format on the verbal behavior of preservice physical education teachers in a microteaching episode. A structured lesson plan format was designed to guide the subjects in the development of performance objectives, mechanical analysis of skills, and identification of teaching cues. It was assumed that the use of the structured lesson plan format would produce increases in the incidence and specificity of augmented verbal feedback statements. The subjects were 24 third-year physical education majors who were enrolled in a teaching methods class. A treatment group - control group experimental design was used to test the effect of the intervention (use of the lesson plan format), and a method of random selection was used in assigning subjects to groups. Subjects in both groups used Mosston and Ashworth's (1986) practice style in teaching two ten-minute badminton lessons to a group of ten peers. The lessons were videotaped, and a systematic observation instrument was used to collect data related to the incidence of input teaching behaviors, as well as the incidence and nature (positive-specific, positive-general, corrective-specific, corrective-general) of verbal feedback behaviors. Prior to the intervention, baseline data were collected for these two variables (input and feedback). Students were allowed to design their own lesson plan format for the first teaching episode. After the first lesson, students in the treatment group received one hour of instruction in the use of the designated lesson plan format. Subjects in the control group received only general feedback and instruction, and continued to use their own planning formats. Post intervention data were collected for the second teaching episode with the use of the systematic observation instrument. Analyses of Variance with Repeated Measure were computed to compare the adjusted posttest means of the two groups for: 1) the total number of input behaviors; 2) the total number of feedback behaviors; and 3) the nature of feedback statements. Significant differences were found for the comparison of the nature of feedback behaviors ($p < .05$). Subjects in the treatment group provided higher rates of corrective specific feedback. This finding has important implications for the improvement of teaching. Structured lesson plans may facilitate the application of skill analysis to the provision of appropriate feedback.

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Tuesday, April 14
9:00-10:15 a.m.

AN INTERPRETIVE INQUIRY OF TEACHER THINKING: AN ELEMENTARY PHYSICAL EDUCATOR'S CONCEPTION OF GAMES AS CONTENT.

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The purposes of this study were to (a) characterize the conception of games held by an experienced elementary physical educator; i.e., her knowledge and attitudes about games as content for school children; and (b) to describe the factors influencing her conception. An interpretive research paradigm supported the design of this study. Qualitative data were collected in the naturalistic setting through nonparticipant observation and interviews. The researcher observed 45 games lessons and conducted informal interviews throughout each of 14 days over approximately two months. Patterns of behavior and categories of knowledge and attitudes were derived inductively from the data. The teacher's conception of games was found to be four dimensional and influenced by three major factors. The four dimensions were: (a) subject matter knowledge (knowledge about the content of games and sports including rules, procedures, strategies, and skill analysis); (b) pedagogical knowledge (knowledge about the ways children learn and interact specifically with the content of games); (c) curriculum knowledge (knowledge about the ways content is organized for kindergarten through sixth grade); and (d) value orientation toward the content (content she thought was valuable and appropriate for elementary school children). The three factors influencing her conception were (a) her own patterns of participation in physical activity; (b) theoretical knowledge from inservice workshops, graduate courses, and professional literature; and (c) the contextual setting, in particular, the responses of the students. This study portrays a teacher's conception of content not as theory built on neatly ordered, internally consistent propositions, but as a complex working theory. This working theory was embedded in the often messy, unpredictable world of a teacher and her students and built on the relationships among personal experience, theoretical knowledge, and specific children working with specific ideas in a particular situation.

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Tuesday, April 14
9:00-10:15 a.m.

THE IMPACT OF STUDENT TEACHING ON BELIEFS REGARDING STUDENT DECISION-MAKING. Paul G. Schempp, University of Oregon.

The purpose of this study was to determine the influence of the student teaching experience on physical education teachers' beliefs in having students make in-class decisions. Ample research attests to the benefits of allowing students to make decisions regarding content selection, the teaching/learning process, and the operational environment of the gymnasium (Lydon, 1976; Mancini, 1974; Martinek, 1976; Schempp, 1981). However, recent literature on teacher socialization in physical education indicates student teachers may develop attitudes and beliefs which appear contrary to the decision-making autonomy of students (Placek, 1983; Schempp, 1985; Templin, 1981). A limitation in the present socialization literature is that it focuses on what teachers believe a teacher should do. Teachers' beliefs regarding the decisions students should make remains a largely unexplored area. This study determined the level of decision-making physical education teachers believed appropriate for students, and assessed the impact of the student teaching experience on those beliefs. A pre-posttest design was used to determine changes in the beliefs of 44 volunteer physical education student teachers. The teachers' beliefs were assessed using the Prospective Physical Educator Belief Scale (Askew, 1978). Pretesting was completed 5 weeks prior to the commencement of student teaching and posttesting was undertaken during the final week of the 10-week teaching experience. To insure an adequate sample size and to control for potential intact group bias, data were collected over a 2 year period from 4 separate groups of student teachers. Data were analyzed using a correlated t-tested with the pre and posttest results serving as correlates. A t (43 df)=2.142 was determined significant ($p<.05$). Mean score analyses indicated the shift was to a believe in fewer decisions to be made by students (pretest M=66.9, S.D.=9.4; posttest M=69.5, S.D.=9.2). However, the difference between the pretest and posttest means, although statistically significant, did not appear practically significant, especially given the S.D.s exceeding the differences between the means. The possible test score range was 35 to 103 (68 points) with a test mean of 81.3. In this study, the difference between the pre and posttest means was less than 3 points and combining the pre and posttest scores produced a grand mean of 68.2. It was therefore concluded that the student teachers in this study believed physical education students should be allowed to make a moderate amount of the in-class decisions, and further, these believes did not undergo a radical change as a result of the student teaching experience.

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Tuesday, April 14
9:00-10:15 a.m.

THE EFFECTS OF A PERFORMANCE BASE CURRICULUM ON THE GROSS MOTOR DEVELOPMENT OF PRESCHOOL CHILDREN DURING TEACHER TRAINING: A PILOT STUDY.

Hans van der Mars, Arizona State University and Stephen A. Butterfield, University of Maine.

The purpose of this pilot study was to examine the effects of a structured, task-analyzed curriculum taught by preservice physical education teachers on fundamental motor skill development of preschool children. Intact groups from separate University sponsored day-care programs served as control (N=9, 6 boys, 3 girls) and treatment (N=15, 8 boys, 7 girls) groups. The mean age of 65.5 months for the control group was significantly different from that of the treatment group (54.6 months), $\underline{t}(19) = 3.72$, $p < .01$. Both groups were similar in weight. The Ohio State University Scale of Intra Gross Motor Assessment (OSU SIGMA) was used to collect data on 11 basic gross motor skills. The OSU SIGMA is a criterion-referenced assessment tool, designed to examine the quality of performance from a developmental point of view. Each skill is divided into four performance levels ranging from Level I (least mature) to Level IV (most mature). The 24 subjects were individually pre and posttested on 11 SIGMA items by two trained examiners. Inter and intrareliability percentages ranged between 96.3 and 98.1. Following training in the use of the Performance Base Curriculum (PBC) preservice teachers taught eight 40 minute sessions in an on-campus teaching laboratory as part of a Methods class. For the purpose of analysis, improvement in functional motor skill development was defined as percent of improvement on skills pretested as immature. The control group's mean improvement across skills was 29.05% (SD = 20.95), and 47.96% (SD = 21.56) for the treatment group. The approximately 19% difference favoring the latter appears to be attributable to the involvement in the instructional program. Greatest improvements occurred in running, throwing, catching, hopping, and ladder climbing. Sex differences were also observed in the treatment group. There was a 10% difference in mean improvement favoring the girls. Girls showed larger gains (10% or greater) in: running, catching, jumping, ladder climbing, and stair climbing than boys. It appears that a) novice, inexperienced teachers using a highly structured curriculum in limited amounts of allocated instructional time, can establish gains that go beyond the usual rate of gross motor development; b) sex differences established through culturally sex role learning can be minimized; and c) having preservice teachers use a highly structured program can let them experience directly the positive consequences of their instruction.

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Tuesday, April 14
9:00-10:15 a.m.

EFFECTS OF A VALUES MODEL ON ALTERING MORAL REASONING, SPORTSMANSHIP PERCEPTIONS AND BEHAVIORS OF MALE ADOLESCENT BASKETBALL PLAYERS.

Thomas Wandzilak, Tim Carroll and Charles J. Ansorge, University of Nebraska-Lincoln.

The development of values such as sportsmanship through physical activity has been a major objective of physical education and athletics. However, the few studies completed in the affective domain reveal that the sport experience has been unable to develop sportsmanlike values. This ineffectiveness may be attributed to poor learning experiences, inconsistent teaching techniques and negative role models that deal with values development through sports participation. The purpose of this study was to determine the effectiveness of a model in producing changes in the sportsmanship perceptions and behaviors of male, junior high school basketball players. The Defining Issues Test (DIT) and the Action-Choice Test for Competitive Sports Situations (ACT) were administered during the first and last weeks of a nine-week basketball season. In addition, behaviors of three players from each of the experimental (n=10) and control (n=10) groups were systematically observed throughout the season. An interval recording system was utilized to collect data on sportsmanlike and unsportsmanlike acts during games and practices. A 2 X 2 (Groups by Pretest-Posttest) repeated-measures ANOVA was used to determine the effects of the model on the responses to both the DIT and ACT variables. Results revealed no difference ($p > .05$) between the groups for either dependent variable. However, comparison of pre- and post-season mean scores from each of the instruments and analysis of the behavior patterns of the players observed suggest that the experimental group made progress towards developing sportsmanlike perceptions, had higher levels of moral reasoning, exhibited an increased number of sportsmanlike acts and decreases in unsportsmanlike behaviors. Subjects in the control group developed unsportsmanlike perceptions, lower levels of moral reasoning, increases in unsportsmanlike behaviors and a decrease in sportsmanlike actions. This model has potential for improving sportsmanlike values perceptually and behaviorally for participants in athletics.

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Tuesday, April 14
9:00-10:15 a.m.

MEDICAL ASPECTS: A COMPONENT OF CERTIFICATION FOR PHYSICAL EDUCATION. Sue Whiddon, University of Florida.

Physical educators have a moral and legal responsibility to provide a safe environment for participants and to act in a prudent manner when injury occurs. The high incidence of injuries in this area substantiates the need for physical educators to be competent in the prevention and care of activity injuries. One means of assuring professional competence in the medical aspects of teaching is through state teacher certification. This 1985 study's purpose was to investigate and determine the number of states which mandated coursework in the emergency care of injuries through teacher certification in physical education.

A letter requesting a detailed list of the teacher certification requirements for physical education were requested from each state's department of education. Responses were received from all fifty states. Standards were examined for evidence of coursework requirements in the medical aspects, i.e. first aid or care and prevention of injuries.

An analysis of the data indicated only 28% (14 states) of the states required specific coursework in the care and prevention of injuries and/or first aid for physical education certification. Eight of these required study in both courses while three states mandated first aid only. The other three states accepted either course for requirement fulfillment. The remaining 72% of the states did not specify coursework in first aid or care and prevention of injuries. In essence, a large majority of states permitted their preparatory institutions to determine if coursework in the medical aspects was required in satisfying the minimal hours for certification.

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Tuesday, April 14
9:00-10:15 a.m.

THE EFFECTS OF A CORPORATE FITNESS PROGRAM ON CHOLESTEROL/HDL-C RATIO, BODY FAT PERCENTAGE AND MET LEVEL OF CORPORATE EMPLOYEES, Jenny L. Brock, John S. Anderson, and Whitfield B. East, East Tennessee State University.

The area of corporate fitness and wellness has experienced phenomenol growth in the past five years. Unfortunately, much of this growth has been uncontrolled, creating a gap between the current status of program effectiveness and the general body of knowledge. The purpose of this study was to determine the effects of a self-initiated corporate exercise program upon certain selected physiological variables.

One hundred and forty-one subjects voluntarily participated in a company sponsored employee fitness program. All subjects participated in a physiological assessment which included testing for cardiovascular endurance, body composition, low back function and total cholesterol/HDL-C ratio (TC/HDL-C). Following an exercise consultation, each employee began in an individualized exercise schedule. The company developed an aerobic point incentive plan to reward the employees for their continued participation.

After one year in the program, thirty-six employees (male $N = 22$, female $N = 14$) chose to participate in a post-assessment. Grouped by sex, a dependent t-test design was used to determine the significance of difference between pre- and post-test means. The female group showed a significant decrease ($p < .031$) in the TC/HDL-C ratio during the year ($M_1 = 4.02$, $M_2 = 3.67$). This change may be attributed in part to the significant change ($p < .029$) in HDL-C levels ($M_1 = 49.85$, $M_2 = 54.22$). Although absolute changes were seen in MET level and percentage of body fat, these differences were not statistically significant. For the male sample, significant differences were found between pre- and post-measures for TC/HDL-C ($M_1 = 5.04$, $M_2 = 4.24$, $p < .001$), MET levels ($M_1 = 6.732$, $M_2 = 8.014$, $p < .026$), and HDL-C ($M_1 = 42.664$, $M_2 = 48.64$, $p < .05$).

Based upon the results, it is apparent that the self-initiated exercise programs resulted in significant changes in certain physiological variables. The change in TC/HDL-C ratios was due to the increase in HDL-C rather than a decrease in total cholesterol. This factor is highly attributable to the increase in aerobic activity for which these thirty-six employees were monitored through the aerobic point plan. The company was extremely pleased with the reduction in the TC/HDL-C risk ratio for both the male and female groups and felt it increased the possibilities of preventing future catastrophic heart related disease.

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Tuesday, April 14
10:45-12:00 noon

ETHNIC DIFFERENCES IN THE MOTOR PERFORMANCE OF PRESCHOOL CHILDREN AND THEIR PARENT'S ATTITUDES.

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This research examined the relationship between the motor performance status of Anglo, Asian, and Hispanic children and parent attitudes concerning motor development. Major hypotheses tested were: (1) there will be significant differences in children's motor performance due to ethnicity, age and sex; (2) there will be significant ethnic differences in the parent's attitudes; and (3) parent attitudes will be significantly related to children's motor performance. Subjects were 233 children (120 Boys; 113 Girls) 3.0 to 6.6 years, and categorized in groups, younger (36 to 50 mos.) or older (52 to 78 mos.). The sample was 46% Anglo, 26% Asian, and 28% Hispanic. Motor performance was assessed with the short form of the Bruininks-Oseretsky Test, BOT, (Bruininks, 1978). It has three categories, gross motor, fine motor, and upper limb coordination. One parent for each child was interviewed; 83% mothers and 17% fathers. Attitudes were determined with the Parental Concern for Motor Development, (Schnabl-Dickey, 1977), a 20 item attitude inventory with five common factors. Hypothesis one was tested by use of a three factor analysis of variance (3 x 2 x 2) and appropriate post hoc tests. Major findings were: (1) performance of Asian children was superior to Hispanics, but not Anglos ($p<.05$); (2) gross motor differences between older and younger Asians were significantly greater than those of the other ethnic groups ($p<.05$); (3) age differences were greater for boys than for girls in gross and fine tests ($p<.05$); and (4) a sex difference favoring boys in upper limb coordination ($p<.01$). A one factor analysis of variance tested H_2. Ethnic parents differed significantly ($p<.05$) in their attitudes about motor development (Factors 1 to 5). For example, Anglos believed strongly that a child should learn motor skills while young. Hypotheses one and two results provide new information about motor performance of children in different cultures. Observed differences in children's performance and their parent's attitudes have implications for programming. Finally, Pearson correlations were used to examine the relationship between attitudes and performance (H3). Results indicated that children's performance on BOT had a significant relationship with parent attitudes. For example, their performance on each of the three components has a significant correlation with parent responses in Factor 3 "early breadth of skills". These analyses also indicated ethnic differences in the relationships. Correlational patterns revealed are complex, and a complete understanding will require more research.

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THE EFFECTS OF LONG DISTANCE RUNNING ON PREADOLESCENT CHILDREN.

The purpose of this study was to investigate the effects of selected physiological variables on preadolescent male and female long distance runners. The variables investigated were maximum oxygen consumption, bone density width, cortical score, and bone mineral content. Preadolescent (n=40) 8-, 9-, and 10-year-old males and females participated in this study. Twenty subjects had been running 20 miles per week for 2 months or longer. Twenty subjects had not undertaken a regular schedule of exercise. Data were collected at Texas Woman's University. Maximum oxygen consumption was determined on the treadmill by the Bruce protocol and gas analysis. Bone density and cortical score were determined by x-ray densitometry and bone mineral content assessed by the Norland Cameron Bone Mineral Analyzer. A 3-day dietary recall was used for a nutritional assessment. Data were analyzed with the MANOVA to determine if there was a difference between the groups for each physiological variable. A significant difference was found in the maximum oxygen consumption, bone density and bone mineral content between the trained and untrained children. There was no significant difference in the cortical score and 3-day dietary recall of the trained and untrained children. It was concluded that long distance running may have affected the bone density width, bone mineral content and maximum oxygen consumption in a positive way.

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Tuesday, April 14
10:45-12:00 noon

EFFECTS OF AGE AND EXPERIENCE IN ANALYZING SPORT SKILL.

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Children and adults differ in learning and performing motor skills. However, little research has been conducted to determine if highly skilled children know as much about how they are performing as their adult counterparts. This study was designed to determined if novice and expert children and adults analyze a performance similarly. Experts were at a mature stage of throwing (Robertson's component analysis) while novices were at a lower stage in all components. Expert children were expected to analyze the skill similarly to expert adults but more effectively than novice adults. The task was to observe a film of an overhand throw and to analyze the skill for errors. The throwing performances were presented by a Kodak super-eight projector. When the film was projected the subject was to determine if an error was performed by the thrower and, if it was, what the error was (forced choice). Subjects were also asked to estimate how far the ball would travel in comparison to the previous throw. Dependent variables measured were error analysis, throw comparisons, and distance estimations. The study was a 2 (expert, novice experience level) x 3 Age (6, 11, 19 years) x 4 (trials) randomized design with repeated measures on the last factor. ANOVAs were calculated with error, comparison, and distance estimation of response as the dependent variables. For error diagnosis, experience was significant but the age main effects and its interactions were not significant. Expert groups were more accurate than the novice groups with the children and adults in the expert group performing similarly. Supporting previous studies in the clinical diagnosis area, experience with the skill aided performance analysis. For distance estimations, experience was also significant. The expert groups' estimations were more accurate than the novices at how far the ball would travel. Once again, age was not a factor influencing distance estimations. Predictions were supported by the study. Experience not age was the major factor in explaining the superior performance of the experts. The major finding of the study was that children at a mature stage of throwing can analyze performance. A secondary finding was the novice throwers could detect errors in performance when the throw to be analyzed was at a lower stage. Additional research in the area of expert/novice differences is needed to determine the processes involved in the development of expertise.

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Tuesday, April 14
10:45-12:00 noon

EXERCISE VIDEOS: A CRITICAL ANALYSIS. Nicki L. Eoff, University of Nevada-Reno; David Q. Thomas, University of Massachusetts, Boston.

A large number of people depend on exercise videos as their source of fitness information; however, previous reviews have failed to critically analyze the information presented. The purpose of this study was to analyze the top ten selling exercise videos in terms of time spent in selected components of fitness, frequency and extent of misinformation and contraindicated exercises. The temporal components of fitness analyzed were warm-up time, anaerobic exercise time, aerobic exercise time, cool-down time, and total time. Each video was reviewed repeatedly to determine the variables mentioned above and analyze them according to current information from exercise and fitness experts. A stopwatch was used to collect the temporal data and notes taken by the reviewers recorded instances of misinformation and demonstrations of contraindicated exercises. All ten videos were found to contain misinformation and demonstrations of contraindicated exercises. All but one video consisted primarily of anaerobic exercises and eight videos emphasized ballistic stretching. The authors concluded that the public must be educated in the selection of exercise videos. The selection of videos should be based on the quality of content and not celebrity status of the exercise leader.

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Tuesday, April 14
10:45-12:00 noon

FACTORIAL VALIDITY OF PARENTAL ATTITUDES ABOUT THEIR CHILD'S MOTOR DEVELOPMENT.

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Parental attitudes about their child's motor development status and physical activity/play patterns are very important, especially during the preschool years (Malina, 1973, 1977). To date, this topic has received only limited attention by researchers. Schnabl-Dickey (1977) constructed a 20-item Likert scaled inventory to assess parental concerns for motor development (PCMD). This research examines the generalizability of her initial findings. Subjects were 233 parents of preschool children with a mean age of 4.5 yr. Approximately 80% of parents were mothers, and 20% were fathers. Their median age was 30 years. The ethnicity of sample was representative of southern California(46%-Anglo;26%-Asian;28%-Mexican-American). The PCMD inventory was administered via individual interviews by trained bi-lingual experimenters. Data were analyzed using three methods of factor analysis available in BMDP:principal components (PCA), principal factor analysis (PFA), and maximum-likelihood factor analysis (MLFA).The primary method was principal components (PCA). Two methods of rotation were used,orthogonal and oblique. The results for only the first, will be discussed since little new information was provided by the second method. The PCA method yielded six factors with eigenvalues $\geq$ 1.00. These factors accounted for 59% of the total variance, and each, contained at least two items with loadings $\geq$ .40. The PFA method yielded three factors accounting for 77% of variance. These factors contained the same items as Factors 1 to 4 of the primary analysis (PCA).The results for MLFA were similar to those for PFA. Thus, the primary method of factor analysis (PCA) yielded six factors and four of them were verified by the alternative methods (PFA, MLFA). Interpretations were discussed for each factor. Factor 1 indicated that parents should encourage their child to participate in physical activities while young. Factor 2 suggested that parents believe vigorous activity is more important than watching television, and fatigue is of little concern. Factor 3 expressed parents' concern for exposing their child to a variety of different physical activities, especially those requiring creativity/exploration. Factor 4 showed parents' concern for their child's total development, motor as well as mental. Finally, results of this study were compared to those of Schnabl-Dickey(1977). Three of her factors were generalizable across samples; that is, her factors (Nos. 1,3,5) were similar to factors(Nos. 1,2,4) extracted in this research.Possible explanations of differences between the studies were discussed, and recommendations were made for future research.

(Data were collected by M. Clifton, Calif. State Univ., LB)

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Tuesday, April 14
10:45-12:00 noon

THE INFLUENCE OF EXTREMES IN HEIGHT, WEIGHT AND SKINFOLD THICKNESS ON THE MOTOR PERFORMANCE OF CHILDREN EIGHT TO FOURTEEN YEARS OF AGE. John L. Haubenstricker, Vern D. Seefeldt, Crystal F. Branta and Sharon A. Evans, Michigan State University, East Lansing, MI.

The purpose of this study was to compare the motor performance of boys and girls who ranked in the upper 25% with those in the lower 25% of their respective age groups according to their height (HT), weight (WT) and skinfold thickness (subscapular + triceps)(SF). The total sample consisted of 75 boys and 65 girls for whom longitudinal growth and motor performance data were available across the age range of 8 to 14 years. The upper and lower 25% were selected, by gender, at each age level for HT, WT and SF. Motor performance measures included the flexed arm hang (FAH), jump and reach (JR), 30-yard dash (TYD), standing long jump (SLJ), agility shuttle run (ASR), sit and reach (SR) and long shuttle run (LSR). Separate 2x2x7 (Group by Gender by Age) MANOVA's with the motor performance scores as dependent variables were run for HT, WT and SF. Follow-up discriminant function analyses were used and classification results were obtained for the significant sources of variation. The results showed significant group, gender and age effects for HT, WT and SF ($p<.001$ for each). A group by gender interaction was obtained for HT ($p=.023$), WT ($p=.007$) and SF ($p=.001$). Age by gender interactions occurred for HT ($p=.035$) and SF ($p=.007$). An age by group interaction was found for SF ($p=.007$). None of the three-way interactions were significant. Discriminant function analysis revealed that performance differences between "heavy" and "light" subjects were accounted for (in descending order) by the FAH, JR, TYD and SLJ scores. However, only 69% of the subjects were correctly classified. FAH, SR, LSR, JR, TYD and ASR scores contributed the most to the differentiation of "tall" and "short" subjects, but only 60% were correctly classified. Subjects with "thicker" SF were separated from those with "thinner" SF by their performance on the FAH, TYD, SLJ and ASR, with 71% of the children correctly classified. Performance on the motor skills is influenced most by extremes in SF, followed by WT, then HT (eigenvalues = 0.312, 0.151, and 0.089, respectively). However, age and gender (eigenvalues = 1.622 and 0.323) are more influential than the growth variables studied. The presence of two-way interactions, particularly the group by gender interactions, indicate that the results are not as straight forward as the main effects suggest. Gender influence is more important in the motor performance of children in the upper extremes of WT, HT and SF than in the lower extremes. The results of this study are in general agreement with those reported previously (Ellis, Carron & Bailey, 1975; Malina & Rarick, 1973).

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AGE DIFFERENCES IN THE TEMPORAL/KINEMATIC PATTERN OF WALKING.

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Changes and impairments in one's pattern of walking have been frequently associated with the aged. For example, when compared to their younger counterparts, older adults have a slower freely-chosen walking speed, shorter stride length (SL), and lower stride rate. In addition, stance width, body sway, and double support time increase and the stance time-swing time ratio decreases. Close inspection of this literature, however, reveals that conclusions about age-related differences in these temporal/kinematic parameters are tenuous because apparent age-related differences are confounded by differences in the freely-chosen walking speed. To assess more accurately the influence of old age on the walking pattern, healthy old (M=73.5 yrs, n=14) and young (M=27.5 yrs, n=15) adults walked overground at two speeds, 1.8 and 3.0 mph. With the combined use of a force platform and WATSMART motion analysis system, data was obtained for SL, stance time, and swing time. Statistical analysis (ANOVA) showed that SL increased as a function of walking speed for both age groups. At the slower speed, there was no age-related difference in SL. However, at the faster speed, SL in the older adults was shorter than in the younger adults. This latter finding indicates that to achieve the faster speed, the older adults adopted a different stride length-stride frequency combination than did the younger subjects. Further analysis showed that despite these differences, the relative percentage of time for stance and swing was not age dependent, although they were speed dependent. Finally, for both old and young, stance times were equivalent for the left and right feet. The present findings indicate that there are age-related differences in certain temporal/kinematic aspects of the gait pattern even when walking speed is controlled. In particular, older adults appear to modify the strategy by which they achieve fast speeds of walking. Rather than simply increasing SL, as the younger adults do, the older adults increase both SL and stride frequency. Despite this change in strategy, the phasing between swing and stance was not altered nor was the symmetry between the two legs. Several reasons may underly the age-related changes observed here. Two possibilities are a) the need to minimize stress on the musculoskeletal system and b) the desire to achieve a more economical pattern of walking.

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Tuesday, April 14
10:45-12:00 noon

Assessment of Knowledge Base in Tennis: A Developmental Instrument

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Developmentalists in verbal and motor behavior have begun to link differences in performance to changes in children's knowledge of specific content. A useful way to assess specific knowledge is a research paradigm examining expert and novice differences. This experiment developed an instrument to examine tennis skill, tennis knowledge and actual game performance of expert and novice male tennis players, ages 8-13 years. A 50-item multiple choice test to examine tennis knowledge was judged valid in content by 3 tennis experts. A KR-20 estimate indicated internal consistency of .79 for 31 expert and novice males, ages 8-13. Validity was indicated in a 2 X 2 ANOVA in which experts were found significantly different from novices with no significant age differences. Some items were revised and the test was administered to 21 male tennis players, ages 8-13; KR-20=.81. For skill evaluation, a groundstroke and serve skill test were constructed and deemed valid by 3 tennis experts. The skill tests were administered twice to 8-10 year old (*n*=14) and 11-13 year old (*n*=20) male tennis players. Scores were analyzed separately for each age level in a subject x day of testing ANOVA. Intraclass correlation coeficients for the serve and groundstroke skill tests were .91 and .72 for the younger age group, and .87 and .88 for the older age group. An observational instrument was designed to assess the performance of individual children during singles tennis play. Behaviors were coded for each individual. The serve during game play was coded for decision and execution while game play following the serve was coded for control, decision, and execution. Four experts and 4 novices were videotaped playing 6 tennis games within two age levels (10-11 and 12-13). Inter-rater reliabilitiy was established by two independent experts observing 4 of the 6 games with each player serving and receiving twice. Four players from each experience and age level were coded on each category of the instrument for the serve and stroke play. Reliability was estimated by # of agreements/(# of agreements + disagreements) x 100 = %. Intra-rater reliability was estimated by observing and coding 8 players on separate occasions using the same procedures indicated in the inter-rater reliability condition. The coding instrument was considered reliable for all categories as inter-rater reliability ranged from .95 to 1.00 while intra-rater reliability ranged from .83 to 1.00. Overall, these instruments were deemed valid and reliable as measures of tennis skill, tennis knowledge and actual game performance.

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Tuesday, April 14
10:45-12:00 noon

BLOOD LIPIDS IN APPARENTLY HEALTHY MIDDLE-AGED MALE MILITARY OFFICERS.

Alfred F. Morris, Armed Forces Staff College; Thomas Mahoney, Old Dominion University.

Coronary Heart Disease (CHD) results in 550,000 deaths in the United States each year. High levels of blood cholesterol, cigarette smoking and high blood pressure are the three main CHD risk factors. Recent evidence suggests that a high level of blood cholesterol is the most important risk factor for current and/or future development of atherosclerotic CHD. To learn more about this risk factor in male military personnel we studied blood cholesterol levels in 247 men, $\bar{X}$ age = 37.2. Total cholesterol (TC) and High-density-lipo-protein cholesterol (HDL) was assessed after standard phlebotomy procedures were used to obtain blood samples. Once TC and HDL values were found, a ratio of TC/HDL was formed to provide even more information regarding CHD risk in this population. Results were TC = 202.15 mg/dl and HDL = 44.84 mg/dl with a ratio of 4.5. These results are within the suggested values of the National Institutes of Health who advise a TC value of 200 mg/dl and a ratio of 5.0 or less for adult men. However, 28.7% of these men had TC readings of 220 mg/dl or higher; and 6% had a ratio of 8.0 or greater suggesting increased CHD risk in these apparently healthy middle-aged male military officers. Based on the above findings it is recommended that these men who had elevated values work to decrease overall TC values and TC/HDL ratios, as well as try to increase HDL (good cholesterol) values. Prudent dietary habits and an increase in aerobic exercise can affect these blood lipid CHD risk factors.

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RELATIONSHIP BETWEEN PREDICTED AND ACHIEVED SCORES ON THE AAHPERD HEALTH-RELATED PHYSICAL FITNESS TEST FOR ROTC CADETS. Kenneth D. Mosely and Barry A. Frishberg, South Carolina State College.

The purpose of this study was to determine how well ROTC Cadets were attuned to their health fitness status. The AAHPERD Health-Related Physical Fitness Test(HRPFT) was administered to 145 ROTC Cadets who were enrolled at a historically Black college. The age range was from 17 to 26 years old, $\bar{X}$=19.75 and all subjects were Afro-American in origin, with 74% of the population being male. Each student was asked to predict his/her score for each test item, as well as estimate what percentile rank that score would obtain based on their age and sex. Spearman Rank Correlation Coefficients(r) were calculated to determine the relationship between the predicted and achieved scores and the predicted and achieved percentile rank. The highest correlation between predicted and achieved scores was for the mile run, r=.53, with ROTC Cadets underestimating their mile run time, $\bar{X}$=415 to 450s. Another high correlation occured with the sit-up, r=.50, with $\bar{X}$=37 vs 39 sit-ups/minute. For body fat and sit-and-reach test items the cadets had similar correlations, r=.37 and r=.39, respectively, with students performing better than expected on each item, body fat, $\bar{X}$=18.3% vs 13.4% and sit-and-reach, $\bar{X}$=24 vs 32cm. While students achieved scores were higher than their predicted scores on all the items, they overpredicted their percentile ranking for all the items. They predicted above average percentile ranking, $\bar{X}$=58-68, yet only achieved average ranking for percent body fat and the mile run, $\bar{X}$=52 percentile rank, and were slightly below average on the sit-and-reach test items, $\bar{X}$=41 percentile rank. Even though the HRPFT was published 5 years ago, less than 3% of the cadets reported previously being administered this test. The cadets perceived their level of fitness to be slightly above average when compared to published national norms. The data indicated that ROTC training programs can achieve appropriate levels of physical fitness but their fitness programs need to place increased emphasis on flexibility and abdominal muscular endurance development. It has also been demonstrated that the HRPFT could be utilized as a pre-screening test to evaluate levels of fitness for ROTC Cadets.

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Tuesday, April 14
10:45-12:00 noon

SUCCESS ESTIMATIONS AND PERFORMANCE IN CHILDREN AS INFLUENCED BY AGE, GENDER AND TASK. Karyn Nelson, Jack Nelson and Amelia Lee, Louisiana State University

Previous research has indicated that variations in the nature of a specific task can influence gender differences in performance expectancies. A task's sex linkage, for example, has been shown to exert such an influence. The purpose of this study was to examine the effects of a manipulated sex association cue on the estimation of success as well as actual performance on a simple reaction time task. Third grade and seventh grade boys and girls (N = 40) were randomly assigned by gender and grade level to one of two test conditions. The sex association of a simple reaction time test was manipulated by instructions that informed the students that the test measured abilities important in the performance of football or dance. The test, an adaptation of the Nelson Reaction Time Test designed for adults was novel to the subjects. A bamboo stick was marked with a target zone and point values above and below the target zone. The test required that the subject stand behind a line and jump to a marked area 30 cm. away. The tester held the stick so that the lower edge was level with the top of the head. When the subject's feet were solidly in the test area the stick was dropped. The subject attempted to catch the stick in the target zone. After the sex association of the test had been defined as football or dance subjects were asked to give an estimate of success (number of catches in the target zone) and then to perform 10 trials. Each subject was tested individually. Data were analyzed in two separate 2 (Gender) x 2 (Grade) x 2 (Task) ANOVAs with the estimation and actual scores as dependent measures. Results for the estimation scores indicated significant differences for grade, gender, and gender x task. Third graders had higher expectations than seventh graders and boys expected to perform better than girls. The follow-up analysis indicated that boys in the football related condition predicted greater success than boys in the dance related condition or any of the girls. Girls showed slightly more confidence in the dance related condition but the difference was not significant. The analysis on the actual scores yielded a significant difference for grade level only, with the older children scoring better than the younger children. These results suggest that performance expectancies obtained prior to engaging in a novel task are affected by a manipulated sex linkage. Boys were significantly more confident when the task was presented as a measure of abilities important in football.

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Tuesday, April 14
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CONTEXTUAL INTERFERENCE IN LEARNING A MOVEMENT SKILL: DEVELOPMENTAL DIFFERENCES.

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When learning a motor skill, randomly presenting movement patterns improved subsequent retention when the goal was to perform in an open environment. Practicing the skill under blocked conditions has not aided the individual when quick decision making was required due to environmental conditions changing. These findings are applicable for the adults, who are mature processors of information, but have not been demonstrated for young children. The purpose of this study was to determine if the advantage of presenting information randomly would apply to children of various ages. Predictions were that since younger children were immature processors of information, they would perform more efficiently when presented speeds in a blocked order; older children would perform more efficiently when presented speeds randomly. The subjects in the study were twenty 5-, 7-, 11-, and 19-year-olds randomly assigned to a blocked or random group (N=80). The movement pattern remained constant but the speed of movement varied. The movement series consisted of movements to 3 out of a possible 9 buttons in a specific order. The three speeds were 800 msec (fast), 1200 msec (medium), or 1600 msec (slow). The design for the experiment was age x group x trials for learning and retention. The dependent variables were programming time and movement time measured in msec. Separate ANOVAs were calculated for learning and retention with follow-up Neuman-Keuls. The significant effects of most concern were during retention: age x group for programming time, and the age x group x trials for movement time. For programming time, results indicated that the 5-year-olds were able to select the movement speed more quickly during retention when originally presented the movement speeds randomly. For the other ages, both blocked and random groups selected the speed similarly. For movement time, retention was better for 5- and 7-year-olds under blocked presentation of speeds but did not contribute to differences in performance for the older age groups. The 5-year-olds appeared to remove their finger from the first key with the onset of the stimulus light and then decided how fast they needed to respond. On the other hand, the 7-year-olds were able to make decisions quickly regardless of group. Random presentation of movement speeds did hinder the ability of the young children to perform the skill accurately.

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Tuesday, April 14
10:45-12:00 noon

A REPORT ON THE ASSESSMENT OF PRESCHOOL AQUATIC MOTOR BEHAVIOR.

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The purpose of this pilot study was to screen an hypothesized developmental sequence for entering the water. The screening assessments used were tests for inclusiveness, comprehensiveness, adjacency, and stability (Halverson & Williams, 1984; Roberton, 1977). Subjects for this study were 5 male and 5 female children ranging in age from 16 to 69 months. Thirty total trials were videotaped while executing entries into an indoor swimming pool from a position on the side of the pool which was level with the water surface. Upon observation of the entries, the subjects' behaviors were classified through use of the Reid Aquatic Entry Category Instrument. The instrument assessed entry behavior in terms of amount of support (3 levels), type of flight (3 levels) and degree of submersion (2 levels). Thus, there existed the possibility of observing 18 (3x3x2) categories. However, observation of the 30 trials revealed classifications using only 8 of the 18 categories. Fewer categories were observed than hypothesized when data were checked for comprehensiveness. A test for inclusiveness revealed that all observed entry patterns were described using the Reid assessment instrument. The test for adjacency suggested that the hypothesized sequence needs to be re-ordered prior to future testing, since the trial to trial behaviors were not absolutely invariant. That is, the observed changes in behavior over trials did not coincide exactly with the originally hypothesized sequence. When stability of the entry patterns was assessed the subjects showed a strong tendency to use the same behavior over trials. Therefore this pilot study revealed that the hypothesized aquatic entry pattern sequence was (1) comprehensive, (2) inclusive, and the behaviors were (3) stable. With the proposed re-ordering of levels (adjacency test) the instrument will be ready for further longitudinal testing.

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Tuesday, April 14
10:45-12:00 noon

PARENTAL ATTITUDES AND OPINIONS REGARDING THE PHYSICAL FITNESS NEEDS OF CHILDREN 5-7 YEARS OLD. Betty Roberts, Marshall University.

The purpose of this study was to determine the attitudes and opinions of parents regarding the physical fitness needs of their 5-7 year old children. A 16-item written questionnaire was distributed to 200 parents living in Huntington, West Virginia. The parents' age range was 20-40 years. The questionnaire dealt with topics such as target heart rate, stress, heart disease "risk" factors, motor skill fitness items, as well as the situp, bent-arm hang and mile run performances of the child. The data obtained in the study was analyzed by percentages. The parents' opinions about the fitness performances were compared to the fitness norms provided in the Walt Disney Educational Media Company's fitness booklet, written in association with the President's Council on Physical Fitness and Sports. This is one of the few publications which provides fitness norms for children as young as 5 years of age. The major results of the study indicated that 80% of the parents were very interested in the child being taught the value of exercise, even though 64% of the parents themselves failed to exercise at least 3 times per week. Less than 30% of the parents were aware of the minimum time needed for a cardiorespiratory workout, yet 67% of the parents believed children experience stress, similar to adults, and had some of the "risk" factors of heart disease, such as high blood pressure, cholesterol, etc. Another significant result of the study was the data which disclosed the parent's expectation of the child when he/she performed the situps and the mile run. Forty-eight percent felt that 16 situps were the maximum number the child should be able to do in a one minute period. The Walt Disney norms indicate the children should be able to do 18-25 just to be considered "fair" on this fitness item. Sixty percent of the parents felt 15-17½ minutes would be necessary for the child to run a mile. The norms, of course, indicate that the time should be considerably less. Many parents, 62%, indicated they would be very concerned about the well-being of the child if the heartbeat reached 175 beats per minute and remained there for a period of 10-15 minutes. These same parents, however, indicated that they would encourage their children to run one and two-mile fun runs in local competition. The study appeared to disclose information which demonstrates that we must continue a dedicated effort to inform parents about the fitness potential and needs of their children in order for them to adopt a healthy lifestyle for later life.

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Tuesday, April 14
10:45-12:00 noon

A SURVEY OF PHYSICAL FITNESS INDUSTRY PROVIDERS IN METROPOLITAN PHOENIX. William J. Stone, Darcel L. Coco, Arizona State University.

The purpose of this study was to survey fitness industry providers in metropolitan Phoenix. The survey was focused on organizational patterns, facilities, programs, participants, equipment, members, fees, personnel, and marketing/advertisement policies. A questionnaire was sent to 200 fitness providers and 48% were returned at the conclusion of a telephone follow-up. The data was descriptive and is reported accordingly. Results indicate that although the private sector is the primary provider/employer, five categories of organization emerge: 1) private/commercial; 2) community agencies; 3) medically related; 4) corporate; and 5) municipal. The responding providers were delivering fitness programs to approximately 150-200,000 adults, with the major portion enrolled in private or community programs. The smallest programs serve as few as a dozen members while a major fitness chain had clubs with over 10,000 members. The three most frequently offered programs were aerobics, general fitness, and weight training. The average age of fitness program participants was 32 years old and overall ratio of men to women was approximately 1:1. That ratio may vary from 6:4 in large fitness centers to 1:3 in smaller clubs offering only one program, e.g., aerobics or weight training. The average large fitness center exceeds 15,000' sq. while smaller clubs with single activities average less than 2000' sq. Free weights, weight machines, and exercise bikes were the most frequently held pieces of equipment at fitness centers. The average monthly dues for a large fitness center was approximately $50 plus initial membership dues. The monthly dues for an aerobics or weight training club was approximately $36. Location, facilities, program and staff were the most frequently used marketing strategies. Most advertising dollars were spent on the yellow pages, direct mailings, and newspaper ads. The ratio of full time to part-time fitness positions in most fitness centers was 3:7. Approximately three times as many non-fitness (support) jobs are generated by large fitness centers. The average fitness center employs six part-time aerobics instructors, one manager and one full time fitness director. The employment opportunities found in this study are consistent with other studies suggesting that there are far fewer full-time professional opportunities in the fitness industry than part-time jobs.

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Tuesday, April 14
10:45-12:00 noon

COMPARISON OF HEALTH HABITS OF PARTICIPANTS AND DROPOUTS OF A SUPERVISED ADULT PHYSICAL FITNESS PROGRAM.

H. Richard Travis, James Madison University; John W. Rader, Valley Wellness Center.

The purpose of this study was to examine health habits of individuals who participated in an executive fitness class at James Madison University, their reasons for dropping out or continuing, and their interest in other topics besides fitness. A questionnaire was developed and had a return rate of 165/273 (60.4%). Statistical analysis of the data utilized SPSS and included (1) questionnaire items, and (2) data regarding percentage body fat and stress test results which were recorded when the individuals initially entered the program. There were two comparisons of the data: (1) dropouts (1 year or less participation, N=49) vs participants (2 years or more, N=114), and (2) dropouts (2 years or less participation, N=78) vs participants (3 years or more, N=85). Both groupings produced similar results. Although different frequencies of response to questionnaire items were found between dropouts and participants, few of these were statistically significant. Females were found more likely to drop out than males ($P < .05$), and the main reason offered was the early morning (5:30-7:30 a.m.) scheduling of the class. Individuals in the program two years or less compared with those in the class three years or more were more likely to state that participation in the class in and by itself was stressful ($P < .05$). The major stress factor cited by the dropouts related to stress created by the early morning hour and the need to rush to work or back home. Other health habits studied included alcohol, seat belts, self examinations, weight control, dental hygiene, and immunizations. Sixty-eight percent of dropouts and 73% of participants stated that participation in the course had resulted in a health habit change. The major changes were more frequent exercise and watching diet. Sixty-one percent of the dropouts and 56% of the participants indicated an interest in formal instruction in other wellness topics besides physical fitness. The major topics of interest in both groups were nutrition/weight control and stress management. When compared to other studies, this research did not find a correlation between poor physical condition and dropout rate. This study re-enforces the results of other research which states that participation strongly correlates with scheduling and a friendly staff who monitor and show genuine interest in the progression of the participants. This research indicates that physical fitness programs create an opportunity to present additional wellness topics. Specific topics and scheduling alternatives will be recommended in the paper.

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Tuesday, April 14
10:45-12:00 noon

A SURVEY OF ADULT FITNESS PROGRAMS AT SELECTED COLLEGES AND UNIVERSITIES.Keri Woodall,Washington State University,Karen DePauw, Washington State University.

To investigate the status of adult fitness programs housed at selected colleges and universities within the United States in 1985. During the Fall of 1985, surveys were sent to 125 selected colleges and universities with physical education departments of 20 or more faculty members as identified in the Physical Education Gold Book (1982-84). Data analysis was limited to those departments that housed an adult fitness program. Ninety surveys were returned. Of the 90 surveys returned, 73 of the colleges and universities had fitness programs and 17 did not. Based upon the results of this study it can be stated that there are identifiable elements common to university/college Adult Fitness Programs. A vast majority of the program directors of the adult fitness programs held a doctorate degree, but less than half were ACSM certified. More than half of the program directors were assigned quarter-time to the program. The majority of the programs employed undergraduate and graduate students. Programs were primarily for use of faculty and staff members. Facilities for leader and self directed activities were available in the adult fitness programs. It was common for facilities of self directed activities to be available for ten hours or more a day, whereas facilities of leader directed activities were available for less than two hours a day. Common activities offered by the fitness programs were jogging/running, strength training, aerobics, bicycling and the racquet sports. A majority of the respondents indicated they offered all of the following services: fitness testing and diagnosis, prescription of exercise, activities and programs, and fitness evaluations. Common areas in which exercise programs were prescribed were cardiovascular/respiratory assessment, body composition, flexibility, and muscular strength/endurance assessment. Typical diagnostic assessments of the were height/weight, blood pressure at rest and heart rate during exercise, skinfolds, nutrition and the sit and reach flexibility test. The more complex procedures and assessments were more likely to be offered with those program directors who held a doctorate degree and/or ACSM certification. Fees for testing ranged from $0 - $25.00 to $100 or more. Two-thirds of the respondents indicated a required screening procedure for entrance into an adult fitness program. Those directors holding ACSM certification were more likely to require a physicians evaluation prior to admission than those without ACSM certification.

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Tuesday, April 14
10:45-12:00 noon

CONTRASTING VALUE ORIENTATIONS AND THE CHANGING STRUCTURE OF WOMEN'S INTERCOLLEGIATE SPORT. Elaine Blinde, University of Illinois.

The structure of women's intercollegiate sport programs has experienced considerable change in the past 15 years (e.g., introduction of athletic scholarships, recruitment, expanded schedules and seasons, post-season championships). It can be suggested that such changes have generally resulted in women's programs which emulate existent models of men's intercollegiate sport. Along with structural change, changes in the value orientations of women's programs have undoubtedly occurred as well. Therefore, one would expect these value orientations to also emulate those found in men's programs. Such a situation has led feminists to claim that female athletes now participate in a sport system which celebrates and rewards male values, while at the same time suppressing the development and expression of female values (Boutilier & SanGiovanni, 1983). This study thus represented an attempt to empirically test such a feminist claim. A 12-page mailed questionnaire was received from 482 former female college athletes who had participated in sport programs at 10 Division I universities across the United States from approximately 1975 to 1986. Items on the questionnaire tapped various dimensions of the female sport experience, including their perceptions of the value orientations of their sport program. A total of 39 values/adjectives were included and the respondent indicated the extent to which such values described her sport experience/program. Factor analyses resulted in the creation of a "male values" and a "female values" construct. The sport program of each respondent was evaluated relative to the degree to which it emulated the male-model of sport (based on 13 criteria). This "program-type" score was then correlated with the total "male values" and "female values" scores. It was hypothesized that as the sport programs of female athletes more closely parallel those found in men's sport, female athletes will be more likely to describe their sport experience in terms of male values and less likely to describe their experience in terms of female values. Results from the correlational analyses strongly supported the hypothesis that there would be a greater emphasis on male values as the sport program emulated men's programs. However, support was not found for the second contention that female values would be suppressed in such a sport system. This study not only represents one of the few empirical tests of feminist claims, but, more importantly, provides valuable knowledge to those concerned with the future development and design of women's sport programs.

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Tuesday, April 14
2:00-3:15 p.m.

EFFECTS OF AEROBIC SWIM AND KARATE CLASSES ON CARDIOVASCULAR FITNESS, BODY FAT, SELF-ESTEEM AND MOOD STATES OF COLLEGE STUDENTS.

Jan Callahan, Thomas Wandzilak, Charles J. Ansorge and Richard Schmidt, University of Nebraska-Lincoln.

In recent years college physical education service programs have received increasing pressure to document their effectiveness through student outcomes. With limited resources controlling the economy of many universities, administrators are calling for accountability if programs are to continue receiving financial support. In addition, investigating the changes in student behavior that result from the participation in physical activity classes is crucial if curriculum and teaching methods are to be improved. Unfortunately, few studies have been completed with these purposes in mind. In response to these needs, a study was undertaken to determine the effectiveness of semester-long aerobic swim and karate classes on cardiorespiratory fitness (Queens College Step Test), percent body fat (calipers), self-esteem (Washington Self-Description Questionnaire) and mood state (Profile of Mood States) of 217 college-age males and females. Subjects in the two experimental groups were members of university-level aerobic swim ($\underline{n}=75$) and karate ($\underline{n}=89$) classes during the spring, 1985 semester. Control group students ($\underline{n}=53$) were from a variety of university academic classes and participated in the study on a volunteer basis. Subjects were tested during the first week and 15th week of the semester. The experimental groups attended class and participated in physical activities 3 times/week for 13 weeks. The control group was not involved in any exercise regimen either before or during the test period and were instructed to maintain their normal behavior pattern throughout the semester. Results of 2 X 3 (Groups by Pretest-Posttest) repeated measures ANOVAs for each of the dependent variables revealed significant ($p < .05$) differences among the groups favoring the experimental swim group for the following measures: step test, percent body fat and self-esteem. This study supports the present structure and teaching method for the aerobic swim class and provides a basis upon which curricular revisions can be made for the martial arts program.

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Tuesday, April 14
2:00-3:15 p.m.

TRENDS REFLECTING NEW AND/OR ALTERNATIVE PROFESSIONAL PREPARATION FOR PHYSICAL EDUCATORS.

Patrick R. Cobb, Georgia Southern College; Doyice J. Cotten, Georgia Southern College; Mary Jo Kemp, Georgia Southern College.

The purpose of this study was to assess the diversity and extent of alternative physical education professional preparation programs within the geographic confines of the SDAAHPERD. Traditionally, the discipline of physical education has been oriented toward teacher preparation, however, two factors have emerged to set the stage for alternative professional preparation courses of study. The first factor is identified as declining enrollments in schools, thereby, bringing about a decrease in the demand for teachers in all areas, including physical education. The second factor is the undisputed increased interest in leisure activities--participant-oriented fitness and recreational sport as well as spectator-oriented athletic events as entertainment. These circumstances have alerted the profession to its changing needs and, to a certain degree, have forced colleges and universities to meet an increasing demand for new directions in physical education professional training. This study was designed to determine the number of schools offering alternative professional preparation options, and the areas of specialization available. Additionally, this survey provided information as to the numbers of majors enrolled in the alternative preparation programs versus the number in the traditional teacher education programs. The questionnaire was sent to 184 four-year institutions within the Southern District. A total of 106 (58%) surveys were returned. The results indicated that of the responding institutions 93 (88%) offered teacher certification in physical education and 80 (75%) offered alternative preparation programs along with teacher certification. The alternative programs were grouped into two major occupational categories: sports administration/management and exercise specialist/physical fitness. Of the alternative programs offered by the responding schools, 121 (63%) required an internship in the area of specialty. Other data shows that of the responding schools, 43% of the physical education departments were housed in the School of Education, 23% in the School of HPER, and 33% were part of other academic units. The areas of physical fitness and sport management are clearly growing options for employment in the future. Career options within these areas will continue to expand. Studies such as this need to be expanded so that colleges and universities will reevaluate student needs and job market trends, and balance curriculum development with available resources.

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Tuesday, April 14
2:00-3:15 p.m.

THE INFLUENCE OF IDEOLOGICAL CURRICULUM MODELS ON PHYSICAL EDUCATION PRACTICE. Catherine D. Ennis, University of Wisconsin-Madison.

An ethnographic study was conducted to determine the influence of the ideological curriculum model on the teacher and observer's perception of practice. The importance of the study lies in the examination of curriculum models relevant to the justification of goals for physical education. In this study, three programs structured and taught by three master teachers were examined in a nine week study. Two programs were developed based on the childrens' physical education model (Logsdon, Barrett, Broer, Ammons, Halverson, McGee, and Roberton, 1984) while the third program was taught based on the more traditional sports and games activity model. Data were collected in five curriculum domains (Goodlad, Klein, and Tye, 1979) representing the perspectives of the model, the curriculum guide, the teacher, the students, and an outside observer. Data from the model and the guide were analyzed using content analysis, while data from field notes and interviews of teachers were analyzed using the ethnographic methodologies of analytic induction, constant comparison and typological analysis. Results reported in this presentation are limited to the influence of the curriculum model on the teacher and observer's perceptions of content taught and experienced in the programs. Activity units based on the traditional physical education model were organized for the purpose of teaching sport skills and fitness activities. "Skill level" evaluation was based on a demonstration of extra effort, participation, and potential. This model represented the metaphor of "Games: microcosm of society" as perpetuated through rule structures, the teacher as the enforcer of the rules, and the importance of working cooperatively with other society or class members to achieve common goals. In the children's physical education model, specific skill tasks were organized to encourage students to exhibit progressively more advanced levels of performance. These kindergarten through fifth grade students were encouraged to evaluate their own performance based on specific skill criteria. Students were taught the decision-making process using skills and strategies. They were consistently allowed decisions regarding content, class management, and equipment. In addition, students were encouraged to utilize higher order cognitive skills to analyze, synthesis, and evaluate movement choices as part of the decision-making process.

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Tuesday, April 14
2:00-3:15 p.m.

ANALYSIS OF THE DIFFERENCES IN JOB SATISFACTION OF SPORT ADMINISTRATORS IN FOUR DIFFERENT SOCIO-ECONOMIC ENVIRONMENTS.

Virden Evans, Florida A&M University; Dewayne J. Johnson, The Florida State University.

The purpose of this study was to analyze job satisfaction of administrators of sports programs in four different countries, each having a different socio-economic structure within their National sports organization. Administrators from Behrain (n=18), Singapore (n=19), Malaysia (n=22), and the Phillipines (n=18) were asked to complete two instruments related to job satisfaction. The Job Description Index (JDI) assessed satisfaction with five aspects of the administrators' job; work itself, immediate supervision, peers, pay, and promotional opportunities. Solomon and Tierney's Determinants of Job Satisfaction instrument (DJS) asked the administrators to rank order the five most important aspects of their job. The score of each aspect was weighted according to the rank each received. One way ANOVA was used to analyze the data. Sports Administrators in Singapore were significantly more dissatisfied with their work than were administrators in the Phillipines and more dissatisfied with their opportunity for promotion than the administrators in the other three countries. Additionally, when asked about the most important aspects of their jobs, the administrators in Singapore and Malaysia identified extrinsic variables (i.e., pay, job security) as most important while the administrators from the other two countries identified intrinsic variables (i.e., challenge, responsibility) as most important. Since the sports program in Singapore would be rated as good as or better in all areas than the sports programs in the other three countries, it would have to be concluded that differences that were observed were due to differences in expectations fostered by the socio-economic cultural environments.

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Tuesday, April 14
2:00-3:15 p.m.

EFFECTS OF A 12-WEEK AEROBIC SWIM PROGRAM ON CARDIOVASCULAR FITNESS, PERCENT BODY FAT, SELF-ESTEEM AND STRESS LEVELS OF COLLEGE-AGE FEMALES. Nancy J. Hansen, Jan Callahan, Thomas Wandzilak, and Charles J. Ansorge, University of Nebraska-Lincoln.

The importance of rigorous physical exercise upon the fitness levels of individuals has been well-documented in numerous studies completed by exercise physiologists and sports psychologists. The majority of this work has been completed in laboratory settings where strict controls over variables can be maintained. Although this work is of great value towards providing a theoretical and factual base for fitness-related programs, little is currently known about the effects of systematic exercise in a class setting. In addition, few studies have concentrated on determining the effects of exercise on subjects in field settings where both physiological and psychological variables are concurrently examined. The purpose of this study was to determine the effectiveness of a 12-week aerobic swim class on cardiorespiratory fitness, percent body fat, self-esteem and stress of college-age females. The following dependent measures were obtained from subjects in the experiment group ($\underline{n}=51$) and control group ($\underline{n}=16$) during the first and 12th week of classes: cardiovascular fitness (Queens College Step Test), percent body fat, self-esteem (Washington Self-Description Questionnaire) and stress (Profile of Mood States). Subjects in the experimental group were assigned to one of three swim levels based on the results of Cooper's 12-minute swim test. Each level followed a prescribed swim-training program for the 12 weeks. Results of 2 X 3 (Groups X Pretest-Posttest) repeated-measures ANOVAs for each of the dependent variables revealed significant ($p < .05$) differences between the experiment and control groups in favor of the former for the following measures: cardiovascular fitness, percent body fat, self-esteem and tension anxiety (one of the six Profile of Mood States scales). Results of this study suggest that participation in regularly scheduled aerobic physical education classes can alter selected physiological and psychological traits.

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2:00-3:15 p.m.

"SMENA": CASE STUDY OF A SOVIET SPORT SCHOOL FOR ELITE YOUNG ATHLETES.

Stephen C. Jefferies, Central Washington University.

The purpose of this study was to examine the organization of an elite Soviet sport training facility. Because all Soviet sports are organized according to an approved official format, the staff of all facilities, regardless of sport specialization follow similar procedures. The information provided by this study is therefore representative of the typical Soviet approach to the training of elite athletes. This project was conducted by the author in the Soviet Union over a period of 10-months. Unlimited access to the facilities, administrators, and coaching staff of one of the most prestigious soccer sport schools in the Soviet Union was granted. The author conducted interviews and regularly observed the day-to-day adminstration of the sport school. Sport school documentation was recorded and is included in this study. The combination of personal experience and official documentation assured the researcher that this study accurately represented the typical Soviet approach to the problem of training elite athletes. The Smena soccer school is a model Soviet sport school in terms both of facilities and organization. Compensating for the severe climatic conditions of Leningrad, the indoor soccer facilities are superb. The school has 18 fulltime soccer coaches, one track coach, an acrobatics specialist, medical personnel, an academic advisor, and two administrators. All coaches are fulltime and either have 4-year coaching degrees or extensive playing experience in the national soccer leagues. Entrance to the school is conditional on passing a motor ability test. In May and September 1,000-1,500, 8-9 year old children are tested and approximately 10% selected. Students train year-round (312 training days), according to established (national) training norms. Researchers from local sport institutes conduct projects of applied interest in the school. The most talented 11-12 year olds participate in a specialist class program that permits twice daily training. The progress and achievements of the sport school are annually evaluated by the city (government) sport committee.

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Tuesday, April 14
2:00-3:15 p.m.

AN ANALYSIS OF THE COMPETENCIES OF ATHLETIC CLUB MANAGERS.

Keith W. Lambrecht, Northern Illinois University.

The primary focus of this study was to determine the competencies required to manage an athletic club. Also, the intention was to determine if differences existed in required manager competencies between varying sizes of athletic clubs for the purpose of developing sport management curricula. Club groups were classified according to membership size: Group I (0 - 999 members); Group II (1,000 - 2,000 members); and Group III (over 2,000 members). The instrument utilized in the research was developed from a study of the literature, validated by a Delphi Panel and field tested. The final questionnaire contained 33 competencies, with a six-point scale used to indicate each item's importance. The computed reliability coefficient for the instrument was +.92. Questionnaires were completed by 264 randomly selected athletic club managers from across the United States, representing the three club groups: Group I (N=83); Group II (N=95), and Group III (N=86). The sample cell size assured a power level of .80 and an effect size of .20 at a significance level of .05. A one-way analysis of variance was employed for hypothesis testing. Tukey's ω Method was used for group comparison of rejected hypotheses, and factor analysis was utilized for clustering competency areas. The following findings were noted: The two highest ranked competencies were "Communication with clientele" and "Employee motivation." Twenty-one of the 33 competencies items were retained, therefore rejecting 12 items. Tukey's ω test revealed that mean scores of Group III were higher than Groups I and II mean scores in all 12 instances. The R-mode of factor analysis identified athletic club manager competency clusters with factor loadings of ±.47 or higher for curricula development. A six-factor solution was extracted: Factor I - Organization Design Components; Factor II - Communications; Factor III - Sport Skills; Factor IV - Public Relations; Factor V - Accounting; and Factor VI - Budgeting. Based on the findings of this study the following conclusions can be stated: 1) There is a difference in required competencies in managing varying sizes of athletic clubs and 2) Sport management curricula should be designed to reflect the different professional needs of athletic club managers.

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Tuesday, April 14
2:00-3:15 p.m.

INSTRUCTIONAL INFLUENCE ON LIFETIME SPORT PARTICIPATION OF ADULTS.

L. Marlene Mawson, University of Kansas

Adults participating in bowling, golf, and tennis were queried to determine the extent that active engagement in these respective sports as an adult was related to school age instructional experience prior to, or after, the implimentation of the nationwide Lifetime Sports Foundation Program in the mid-1960's. Data were collected from 87 bowlers, 70 golfers, and 72 tennis players who volunteered when contacted at sports facilities in the Johnson County and Country Club Plaza areas of Kansas City. Those over 40 years of age were deemed to be of school age prior to the initiation of the Lifetime Sports Program, while those under age 40 were considered to have been influenced by the Lifetime Sports Foundation Program. Responses to the Lifetime Sports Information Questionnaire were obtained to determine whether the adult subjects had received instruction during their school age years in school physical education classes, in community recreation, or in private instruction. Also, each subject indicated the degree of perceived influence of school age instruction on a seven point Likert scale, between strongly discouraged (1) to strongly encouraged (7). A t-test was used to determine significant differences between the two age groups for each sex and for each sport. It was determined that after the Lifetime Sports Foundation Program was inaugurated, a greater percentage of both males and females received instruction or participated in bowling, golf and tennis in school physical education, community recreation programs or private instruction during their school age years, with the exception of a lower percentage of females in golf. Regardless of their exposure to the Lifetime Sports Foundation Program, adults participating in bowling, golf, and tennis reported a significantly greater level of encouragement ($\overline{X}$= bowling 5.3, golf 5.4, tennis 5.8) for lifetime participation in sport if they had received school age instruction in the sport, than those without school age instruction ($\overline{X}$= bowling 3.6, golf 3.5, tennis 4.2). No significant influential differences were found between adults who received school age instruction prior to or after the introduction of the Lifetime Sports Foundation Program.

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Tuesday, April 14
2:00-3:15 p.m.

EXERCISE AND HUMAN PERFORMANCE: A SECONDARY PHYSICAL EDUCATION PILOT PROGRAM. Gloria E. Napper, Deborah K. Cooper, Weld County School District Six, Greeley, Colorado.

The purpose of this pilot program was to instruct high school students in the principles of lifetime fitness by involving them in pre and post fitness testing, cardiovascular fitness conditioning, and cognitive-based laboratory/lecture experiences. Students ($n=12$) were enrolled in a semester (18 weeks) physical education class which met for three days of conditioning and two days of laboratory/lecture. Conditioning sessions included jogging, aerobic dance, and highly active recreational games. Laboratory/lecture activities complemented conditioning days with discussions on nutrition, substrate utilization, coronary heart disease, and the identified risk factors, training principles, and environmental factors affecting training. Fitness testing was completed during the second and third weeks and again at the 15th week. Health-related fitness items were assessed by submaximal bicycle protocol, sit and reach test, maximal grip strength test, and subcutaneous skinfold measurements. Paired t-tests were used to determine the relationship between health-related fitness items obtained from the pre and post tests. No significant differences were found in flexibility or strength between pre and post test ($p > .05$). No significant difference was found in oxygen consumption despite a reduction in the standard deviation ($p > .05$). A significant difference was found in percent body fat between pre and post test measurements ($p < .05$). The results of this pilot program demonstrate a continuing need for innovative programs to improve the physical fitness of secondary students and increase students' knowledge of the benefits of physical fitness.

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Tuesday, April 14
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THE CURRENT STATUS OF ETHICS IN THE HEALTH EDUCATION CURRICULUM.

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While health educators have long demonstrated interest in the ethical behavior of the profession, recent literature suggests a new emphasis on the necessity of training future members of the profession to successfully and confidently meet ethical challenges. This research was conducted to examine the current status of formal instruction in health education ethics in the United States. The study is important because it provides empirical data identifying strengths and weaknesses in the health education ethics curriculum and examines the profession's commitment to ethical instruction.

A two page questionnaire was mailed to all undergraduate and graduate health education programs listed in the 1985 AAHE Directory of Institutions offering Specialization in Health Education. The questionnaire was mailed in January, 1986. An initial mailing and one follow up request resulted in an 80% response rate, a rate that not only lends credibility to the results but also suggests the degree of interest in the topic. Survey respondents provided the following information: (1)the extent to which ethics is being taught; (2)characteristics of faculty who teach ethics; (3)courses and years in which ethics is being taught; and (4)the ethical issues health educators feel should be addressed.

Over half the respondents reported that no formal instruction in ethics was available for their health education students. Of the schools reporting the availability of formal ethics instruction, only 24% offered clearly indentifiable ethics courses. The remaining schools either stated or implied that ethics is somehow included in other courses in the health education curriculum. Of the faculty who teach ethics, 70% received specialty training in either community or school health and over 85% of the individuals teaching ethics had earned doctoral degrees. Lectures with class discussion and analysis of case problems were reported to be the primary methods of ethics instruction.

Conclusions based on this research suggest that ethics is receiving inadequate emphasis in both graduate and undergraduate health education programs. A discussion of the current status of health education ethics is included and suggestions are made for future direction in ethical instruction for health educators.

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Tuesday, April 14
2:00-3:15 p.m.

STUDY OF SELECTED SECONDARY SCHOOL PRINCIPALS' ATTITUDES TOWARD PHYSICAL EDUCATION. Roland A. Thornburg, Livingston University

The purpose of this study was to identify and describe attitudes of secondary school principals toward selected components of the high school physical education programs in Alabama. Utilizing the Physical Education Attitude Survey for Principals, attitudes of the principals were obtained. A thorough review of the literature revealed that few studies had been completed on principals' attitudes pertaining to physical education in secondary schools. The subjects in the study were principals from selected public high schools in Alabama. Two hundred questionnaires were mailed to the principals and 168 were returned providing an 84% return rate. The questionnaires revealed that 95% of the principals believed physical education was a necessary component of the students' high school experience and was worthwhile for the students. It was the attitude of many principals that physical education teachers should be evaluated by the principal. Approximately 62% of the principals believed the physical education teachers they had observed, demonstrated effective teaching skills. Ninety percent of the principals felt that physical education teachers should submit lesson plans. The investigator found most principals believed English was the most important subject in the school and placed physical education fifth among the other nine subjects. Seventy percent of the principals believed fitness activities and health education were the most important content areas in physical education. The category of sports and games was described as the most used approach in the high school physical education class. Most principals reported positive attitudes concerning physical education, however, some were unsure and discouraged with the way physical education is presently taught. Some principals seem to be aware of current curriculum trends in secondary physical education. However, many were unclear about physical education terminology, grading criteria, how to evaluate physical education teachers, remedial and accelerated programs, and effective teaching skills in physical education.

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Tuesday, April 14
2:00-3:15 p.m.

An Examination of the Degree to Which Colleges and Universities are meeting the Educational Needs of Students Pursuing a Degree in Corporate Fitness Programs.

James L. Webb, Cal Poly University

The purpose of this study was to determine the extent to which four year colleges and universities with curriculi in adult fitness or corporate/commercial wellness are preparing students to meet the education, training and competency demands of the corporate fitness job sector. Two surveys were conducted. The first was administered to 50 directors of corporate fitness programs and required rating specified courses and professional preparation within five areas of training (technical knowledge, general health knowledge, business skills, internship, and miscellaneous). Components were evaluated in terms of their degree of importance toward competent professional preparation. Nine personal attributes were also rated and inquiry was conducted into certification issues. A second survey was forwarded to program directors of 75 selected colleges and universities who purported to offer curriculi in adult fitness and corporate/commercial wellness training. This questionnaire requested information with respect to course offerings (outlined in the same format as that provided to corporate fitness directors), the university's involvement in the development of personal attributes, and the extent to which the institutions prepare students for corporate fitness employment. Data were collected and rating scales devised for each survey which allowed comparison between the sampling responses. Findings showed that the educational demands of the corporate fitness profession were being met in the areas of technical knowledge and general health knowledge. However, this was not the case with respect to business skill training, internship involvement and the development of personal attributes essential to success in corporate fitness work. There was general agreement between corporate fitness directors and college/university program directors concerning ACSM certification, and the areas in which college/university programs are deficient in fitness management preparation.

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Tuesday, April 14
2:00-3:15 p.m.

ACCURACY OF SELF-REPORTED RECREATION PARTICIPATION. Stephen C. Anderson, Ph.D., Indiana University; Kathryn Smithyman Kanters, Indiana University.

Response error, that is, the difference between actual and reported participation is a factor that affects scores on most self-reported surveys. The presence of response error is of particular interest to planners in the recreation and parks profession. Recreation and park decisions on policy-making, resource allocation, and budget formulation are often based on the results of self-reported surveys of recreation participation. It is necessary to develop a method of identifying a pattern and the source of response error so survey results can be adjusted to make the information more useful for recreation and park agencies. The purpose of this study was to investigate two different types of recreation agencies, a YMCA fitness center and a municipal golf course, and provide information on the pattern of response error. Two hundred subjects were randomly drawn from the YMCA membership and a sample of 188 golf course members was used for the study. Seventy-seven females (38%) and 127 males (62%) participated in the study. The age of the subjects was fairly evenly distributed and ranged from 18 to 86 years. Two questionnaires were used for the study; one containing questions designed to evaluate fitness participation was sent to YMCA members and the second, sent to golf club members, related to golfing participation. The return rate from the first and second mailings was low (YMCA 24%, golf course 46%, therefore, phone calls replaced a third mailing. This resulted in 112 returns from the golf course survey (60%) and 109 returns from the YMCA survey (55%). Subjects whose response to the question "how many times did you participate ...?" was zero and whose record of participation was also zero were eliminated from the data. There were 17 such cases at the YMCA. These 17 were subtracted from the original 200 cases (equalling 183) and from the 109 returned (equalling 92). This process reduced the response rate to 50%. Non-participation did not occur among golf course respondents. Subjects were asked to estimate their frequency of participation and this was compared to agency figures of actual participation. Data analyses focused on determining the significance of the response error, and the relationship between response error and gender, age, and the skill level of the respondent.

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Wednesday, April 15
2:00-3:15 p.m.

ATTITUDES OF MALE AND FEMALE COLLEGE STUDENTS TOWARD UNACCEPTABLE SPECTATOR BEHAVIOR IN SPORT.

Robert W. Case, Indiana University; Michael G. Lacourse, Indiana University.

Spectator violence at sporting events continues to be a national and international problem (Goldstein, 1983). The purpose of this study was to examine the attitudes of male and female college students toward unacceptable fan behavior in sport. A series of twenty slides depicting varying degrees of unacceptable sport spectator behavior were shown to 410 undergraduates who represented a cross-section of students attending a midwestern university. An "Attitude Toward Unacceptable Spectator Behavior Instrument" was used to assess perceptions toward unacceptable sport fan behavior. The instrument utilized a 7-point scale with response choices ranging from totally acceptable to totally unacceptable. A jury of experts and a pilot study involving 294 subjects were used to refine the attitude instrument as well as identify slides which depicted varying degrees of unacceptable sport fan behavior. A 2X2X3 (sex, spectator/nonspectator, degree of participation) unweighted means ANOVA design was selected. Results showed that male subjects perceived the slides as being more acceptable than did female subjects, $F(1,318)=10.25, p<.01$. Although a gender by level of sport participation interaction failed to achieve significance ($p<.05$), there is strong evidence to suggest that male and female nonparticipants differ in their perceptions of unacceptable sport fan behavior. Male nonparticipants, for example, tended to view unacceptable behavior as being more acceptable than did female nonparticipants. Male and female sport participants, on the other hand, did not differ in their perceptions of unacceptable sport spectator behavior. In conclusion, it is suggested that spectator behavior is a very complex phenomenon requiring continued study from various research perspectives. Although existing studies have focused on aggression levels of fans (Arms et al., 1980) and the dynamics of collective behavior (Lewis, 1982), the results of this study indicate that attitudes and gender differences are two additional variables to be considered when studying spectator behavior in sport.

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Wednesday, April 15
2:00-3:15 p.m.

LEISURE PARTICIPATION AS RELATED TO FEELINGS OF PROFESSIONAL PERSONAL ACCOMPLISHMENT AMONG LEISURE SERVICE PROFESSIONALS.

J. Thomas Chesnutt and Stephen Nagy. The University of Alabama.

The purposes of this study were to determine the status of feelings of job related personal accomplishment among leisure service professionals, and the influence of personal leisure habits and demographic factors upon personal accomplishment. Leisure service professionals are committed to helping others, often in deteriorating work environments. Budgets are being cut while inflation continues to rise, facilities are often antiquated or in short supply, and demand for recreation services is increasing while public officials treat recreation as a luxury rather than a necessity. These factors can lead to dissatisfaction with accomplishments on the job, which in turn can lead to a deterioration of services provided, low morale and absenteeism. The subjects were leisure service professionals who were members of the Alabama Recreation and Park Society. Questionnaires were initially mailed to 165 professionals. Follow-up mailings and phone calls produced an N of 104, for a response rate of 63%. Slightly over half were male (53.5%). The intensity and frequency of personal accomplishment were measured by the Maslach Burnout Inventory, while the Leisure Activities Blank measured leisure participation. Relationships were examined by a Pearson correlational analysis and analysis of variance procedures were applied to determine the effects of demographic factors upon personal accomplishment and leisure participation. There were fewer participation differences based upon sex than was expected. An encouraging finding was the relatively low extent of negative feelings of personal accomplishment among the leisure service professionals. This result could be related to the strong, positive correlations of participation in intellectual leisure activities with both frequency (.35) and intensity (.40) of personal accomplishment, and to the moderate correlation of glamour sport participation with intensity of personal accomplishment (.20). Intellectual activities were seldom competitive and contained strong social components. Glamour sports were physically demanding and provided the participant status and recognition. The results of this study suggest that job related personal accomplishment is enhanced/buffered from negative work influences by the participation in activities which provide social support, physical exercise, and personal recognition.

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Wednesday, April 15
2:00-3:15 p.m.

THE WOMAN ATHLETE AND ALTERNATIVE APPROACHES TO EXPLAINING SPORT PARTICIPATION. Joy T. DeSensi, University of Tennessee.

The purpose of this study was to explore the model of feminist frameworks offered by Jagger and Struhl (1978) in the women's sport setting. This framework offers a classification of models of feminism (Liberalism, Marxism, Radicalism and Socialism) describing the forms of women's oppression and offers a solution for eliminating such oppression. The investigation employs Jagger and Struhl's frameworks to explore the effect of sport in women's lives. Eight women athletes currently involved in the sports of basketball, softball, tennis and volleyball took part in an interview process and discussed concepts relevant to each feminist framework. Results of this study include personal accounts and interpretations of the status of each of the women in their respective sport and their personal beliefs regarding the alternative feminist frameworks offered by Jagger and Struhl. Results include discussions of 1) roots of oppression, 2) race as an issue of oppression in sport competition, 3) the need for the omission of social classes in sport, 4) arguments against compulsory heterosexuality, and 5) the need for society to recognize individual freedom for women in sport.

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Wednesday, April 15
2:00-3:15 p.m.

FEDERAL RECLAMATION AND RECREATION: AN ANALYSIS OF THE DEVELOPMENT AND UTILIZATION OF RECREATION AREAS ON SERVICE PROJECTS.

Henry Eisenhart, University of Oklahoma.

The purpose of this study was to investigate the 333 Bureau of Reclamation Project areas throughout the United States, in order to determine the extent of recreational development and user interest on each property. The Bureau of Reclamation is a twentieth century product of the national policy to develop the Western United States through the construction of reservoirs and irrigation channels. Reclamation recreation areas are developed in Arizona, California, Nevada, Utah, Idaho, Washington, Oregon, Montana, Nebraska, North Dakota, South Dakota, Wyoming, Colorado, Kansas, Oklahoma, New Mexico and Texas. This research project is a compilation of data from each of the 333 project recreation areas. It analyzes location features, user rates (annual) and preferences, administrative control and an overview of the utilization of Federal Reclamation recreation areas relating to participation in a variety of outdoor leisure activities; sportsmen's take and the amount of actual land and water areas available for recreational use through Bureau projects. Research data from the project areas was collected from the seven regional Bureau offices. Additional historical material was obtained and authenticated with the assistance of the office of the Regional Director, Bureau of Reclamation, Amarillo, Texas. An analysis of the data provides a geograhic representation of the amount of Bureau of Reclamation land available for recreational purposes in each of the seventeen Western States. An assessment of the quantitative data shows some interesting patterns of popularity and/or user preference. The Colorado River projects are by far the most heavily used and California supports more project recreational usage than the other states. There were 66,503,451 Visitor days (one visitor for one day) for all project areas and sightseeing was the most prevalent activity (18,811,173) followed by fishing (10,844,948) and camping (10,702,811). Sportsmen's take exceeded 22 million fish and 250,000 water fowl. Bureau of Reclamation projects are the quintessential example of multiple use resources - irrigation (and domestic water) hydroelectric power and recreation. The Bureau's many project areas, located throughout the Western United States contribute significantly to the provision of outdoor recreation experiences and provide many contemporary examples of joint use natural resource settings.

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Wednesday, April 15
2:00-3:15 p.m.

CORRELATES OF DRINKING PROBLEMS BETWEEN VARIOUS COLLEGE MAJORS: IMPLICATIONS FOR IDENTIFYING PROBLEM DRINKING AMONG STUDENTS.

Ruth C. Engs, Indiana University, David J. Hanson, SUNY, Potsdam, NY.

STATEMENT OF PROBLEM. There has been increased interest over the past few years of identifying problem drinking among university students so as to facilitate referral and decrease alcohol abuse and drunk driving. Literature suggests that there may be a difference in alcohol and other drug taking patterns among students in different majors. Thus the purpose of this investigation was to compare 18 problems related to drinking by course of study in a large national sample of university students. It was hypothesized that individuals in social sciences would have the most problems associated with alcohol and that individuals in the health sciences would have the fewest problems associated with alcohol. METHODS. An anonymous pre-coded reliable and valid instrument, The Student Alcohol Questionnaire, was administered to 72 universities around the nation. The resulting sample contained 4266 students. Chi-Square analysis was used to compare the percentage of students majoring in social science, arts and humanities, education, physical science, business or other courses of study to various problems related to drinking. RESULTS AND IMPLICATIONS. Of the problems related to drinking there was a significant difference ($p < .05$) on seven items between the majors. Among business students 60% had driven after drinking compared to a low of 49% for arts and humanities majors. 42% of business students had driven a car while drinking compared to 32% of health science majors, 48% of business students compared to 33% arts and humanities students had driven when they knew they had too much to drink. 13% of business and other majors had damaged university property compared to a low of 6% among health science students. Moreover, 28% of business, 23% other, 21% physical science 19% arts and humanities and education, 18% social science and 14% health science students were heavy drinkers. The hypotheses of social science students having the highest percentage of various drinking related problems was not supported. In view of the fact that a much higher percentage of business students compared to the other majors had various drinking related problems, especially drinking and driving issues, it is recommended that alcohol education and intervention programs be aimed at this population in an effort to decrease possible alcohol abuse and driving related problems among these students.

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Wednesday, April 15
2:00-3:15 p.m.

THE ABILITY OF A WILDERNESS ORIENTATION PROGRAM TO ASSIST IN THE ADJUSTMENT OF INCOMING COLLEGE STUDENTS.

Michael Anthony Gass, University of New Hampshire.

The purpose of this study was to measure the effects of the wilderness orientation program at the University of New Hampshire entitled the "Summer Fireside Experience Program." To examine the effective of such a program, two other groups - a similar precollege experience ("Freshman Camp") and a control group - were compared with the Fireside Program on attrition/retention rates, grade point averages, student development behaviors and attitudes toward the University. All three groups were stratified by sex to see if any potential treatment effects were influenced by male/female differences. The subjects were observed for one year to determine the effect that time had on the changes in the dependent variables. ANOVAs, ANCOVAs and Effect sizes were performed to determine if any differences existed between groups, sexes or in the interaction between these two variables. For those ANOVAs and ANCOVAS that were significant, the Dunn multiple comparison procedure was used to determine group differences. The ANCOVA findings of the study indicate that the Summer Fireside Experience Program had a significant positive effect on retaining students in school after one year (p = .038) and cumulative grade point averages (p = .033). The program was also found to aid students in the growth of certain student development behaviors. These behaviors included developing autonomy (p = .022), developing interpersonal relationships ((p = .035) interdependence (p = .027), tolerance (p = .007) and appropriate relations with the opposite sex (p = .024) There were no significant differences between the groups in the development of appropriate educational plans, mature career plans, mature lifestyle plans and attitudes toward the University. The findings of the study were found to be true for both the male and female participants in the Summer Fireside Experience Program. The implications of this study suggest that wilderness orientation programs, when properly implemented, can aid in the adjustment of students to college.

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Wednesday, April 15
2:00-3:15 p.m.

EXPERIENCED ROLE CONFLICT OF COLLEGE MALE AND FEMALE CROSS COUNTRY AND TRACK AND FIELD ATHLETES.

Patricia McCarthy-Haden, Sharon Ann Mathes, Iowa State University.

The purpose of the study was to examine role conflict experienced by male and female college cross country and track and field varsity athletes at a major midwestern university. The sample was composed of 28 female and 30 male athletes. The instrument employed was a 24-item modified version of the experienced role conflict instrument developed by Sage and Loudermilk (1979). Based on a review of the literature the original ten experienced conflict items designed for women were increased to 24 appropriate to women and men. Items which pertained to academic, psychological,social and winning/losing pressures were added. Athletes recorded a value from 1 to 5 (1=no problem,5=great problem) indicating the extent to which any of the situations listed were a source of personal concern. Analyses of the data showed that as a group the athletes did not tend to experience a great deal of role conflict (M=58.8, SD=12.2). On the overall scale no significant differences were found between women (M=61.89 ,SD=19.58) and men (M=58.88,SD=12.22). A review of individual items showed women scoring three items: status (high status in high school decreases in college..), fear of inability (fearful of inability to perform up to capability), fear of losing higher than men. Males scored the item which pertained to the conflict associated with the changing value of sport (sport has been valued by society, but the importance of sport is decreasing) significantly higher than women. The results suggest that men and women are more alike than different in experienced role conflict. In addition, the data suggest the need to extend the dimensions of role conflict previously examined.

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Wednesday, April 15
2:00-3:15 p.m.

AN EXAMINATION OF COLLEGE STUDENTS PARTICIPATION IN PHYSICAL FITNESS AND LEISURE ACTIVITIES.

Robert D. Hefley and Ed F. Olive, Clemson University, George T. White, Delta State University.

The purpose of this study was to investigate the average weekly number of hours a typical college student spends participating in various physical fitness and leisure activities. In addition, the study sought to identify and measure the variables limiting student's participation in these activities. A survey was taken of one hundred random students, with both sexes equally represented. To qualify the students were required to take between fourteen and nineteen hours during the semester. Respondents were asked to estimate the average number of hours spent weekly on various fitness and leisure activities. Students were also asked to determine what factors affect their level of participation and to estimate the number of hours weekly they engage in these non-sporting activities. These activities included such activities as socializing, leisure pursuits, and various school related extracurricular activities. Intergroup comparisons were analyzed by calculating means for each questions response. Results indicate that the average male student spends 10.37 hours a week participating in various physical fitness activities. For males, the three most popular activities were: basketball (2.94 hrs./wk); weightlifting (1.84 hrs./wk); and jogging (1.36 hrs./wk). The coeds devoted approximately 8.30 hours a week to fitness activities. Favorite activities were: aerobics (2.71 hrs./wk); jogging (1.38 hrs./wk); and walking (.90 hrs./wk). Students responded that studying was the biggest factor which limited their time for physical activity. Males spent an average of 12.37 hours a week studying while the females weekly average was slightly higher at 14.28 hours. Other factors which limited participation were: verbalizing with other students (11.96 hrs./wk); partying (11.47 hrs./wk); and watching television (6.23 hrs./wk). The average student spent 4.85 hours a week participating in various extracurricular activities such as clubs and organizations. In conclusion, the students are spending more time studying, partying and talking to friends than they spend exercising. However, they enjoy fitness activities and seem knowledgeable on the subject, but are limited by their involvement in other activities. If a student wishes to become more involved in weekly physical activities, they should balance their time more effectively or decrease involvement in other activities.

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ANDROGYNY AND RECREATION PARTICIPATION FOR WOMEN

Karla A. Henderson, Deborah Stalnaker, Glenda Taylor, Texas Woman's University

The concept of androgyny suggests that it is possible for an individual to be both assertive and compassionate, instrumental and expressive, masculine and feminine, depending upon the situational appropriateness of these various modalities (Bem, 1977). The purpose of this study was to analyze the personality traits of female students, staff, and faculty at Texas Woman's University to determine how these personality traits were associated with recreation participation. A mailed questionnaire consisting of items related to the Bem Sex Role Inventory, barriers to recreation participation, participation in recreation activities, and selected demographic questions was sent to a randomly selected group of TWU students, staff, and faculty during the spring of 1986. A 60% response rate was obtained with 294 cases used in the analysis. The sample consisted of 19% staff, 33% graduate students, 23% undergraduates, and 23% faculty. The respondents were analyzed on the sex role personality types of masculine, feminine, undifferentiated, and androgynous. The four personality types were compared to demographic characteristics. Students (both graduate and undergraduates) were more likely to be androgynous while the faculty were more masculine than the other three groups. The most common recreational activities done were mass media, social, educational and church activities. When the differences among the four personality groups were compared to activity participation, no statistical differences were found among social, outdoor, sports, cultural, hobbies, church, and education. Conclusions suggested that personality type by sex role orientation did not seem to have a relationship to leisure satisfaction and specific activity participation among this sample of faculty, staff, and students. It appeared that the women in the study were more alike than different when personalities traits were measured in relation to recreation activity participation.

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Wednesday, April 15
2:00-3:15 p.m.

AN EXAMINATION OF THE VALIDITY OF HERZBERG'S MOTIVATION-HYGIENE THEORY WITH REGARD TO SUMMER JOB SEEKERS.

Andrew Hoff, Gary Ellis, John Crossley, University of Utah.

The purpose of this study was to examine the validity of Frederick Herzberg's motivation-hygiene theory, with regard to summer job seekers. Subjects included 432 randomly sampled individuals who attended a summer "job fair" for potential recreation and leisure employees. Each subject completed a questionnaire which asked them to rate the importance of each of 28 characteristics of the job setting in which they hoped to obtain employment. Fourteen of those characteristics were written to represent Herzberg's "motivation " dimension and an additional 14 characteristics were designed to represent the "hygiene" dimension. As scales, the two sets of items produced alpha reliability coefficients of .91 and .89, respectively. In addition, data were collected concerning students' gender, student status (high school, college, nonstudent), and desired employment setting (residential camp, day camp, resort/hotel, pools/aquatics, and playgrounds/recreation centers). The matrix of correlations among the 28 items was factor analyzed. Based on Herzberg's position that the two factors are unrelated, axes were rotated to simple solution according to the varimax criterion. A-posteriori MANOVA tests were conducted to determine if significant differences existed across categories of the school status, gender, and desired employment setting variables. Two factors explained 49.2% of the variance. Thirteen of the fourteen items which were designed to measure the "motivation" dimension produced loadings in excess of .30 on the first factor. Similarly, 13 of the 14 items which were designed to measure the "hygiene" dimension produced loadings in excess of .30 on the second factor, thereby supporting Herzberg's theory. Some of the items, however, produced high loadings on both of the factors, suggesting that they may serve as both a motivator and a hygiene factor. A significant MANOVA on the comparison of motivation and hygiene scores by student status was followed up with the calculation of simultaneous confidence intervals. This analysis revealed that high school students rated hygiene factors significantly higher than college students. No significant differences were found on the motivation scale by student status. These results supported the validity of Herzberg's theory with summer job seekers. Results also, however, bring to question the independence of the two dimensions with this population.

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Wednesday, April 15
2:00-3:15 p.m.

BEHAVIORAL SPORT INVOLVEMENT OF ADULT EMPLOYED FEMALES AS A FUNCTION OF SELECTED SOCIOECONOMIC VARIABLES. Elaine Blinde, University of Illinois.

The purpose of this study was to examine the relationship between both the type and extent of adult female sport involvement and five selected socioeconomic variables. Given the increased involvement of women in the domain of sport, this represented an attempt to learn more about who does and does not participate in sport. A questionnaire was mailed to 600 adult female employees at a major university. Respondents identified the frequency of their sport involvement for the preceding 12-month period as active participants, spectators, and consumers of various mass media forms. Four hundred and eighty (80%) questionnaires were returned. Data were analyzed to determine the relationship of reported sport involvement to the female's occupational level, educational attainment, age, and marital status, as well as to the socioeconomic status of the husband of married respondents. The chi-square statistic was used to determine significant associations between involvement rates in 75 specific sport activities and each of the five socioeconomic variables. Major findings related to amount and type of involvement can be summarized as follows: (1) Age was more related to the total amount of sport involvement than to the type of sport involvement. (2) Both educational and occupational levels were related to the type of selected involvement. (3) Educational and occupational subgroups did not generally vary on the total amount of reported sport involvement. (4) Young, single females were the most active actual participants in sport activities. (5) Analyses of marital status subgroups revealed few differences in the amount or type of sport activities attended as spectators or watched on television. (6) The socioeconomic status of the husband was not generally related to either amount or type of sport involvement. General characteristics of activities preferred by females of differing occupational and educational levels are also identified. It appeared that variables directly related to the individual female were more highly associated with her sport involvement than the measure of husband's socioeconomic status. Possible explanations are offered as to why the behavioral sport involvement patterns of adult employed females are so varied. Based on the results of this study, it can be concluded differential socioeconomic characteristics are related to both the type and extent of adult female sport involvement. With the knowledge gained in this study, segments of the female participation not involved in sport can be targeted for future intervention strategies.

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Wednesday, April 15
2:00-3:15 p.m.

TITLE

AN ASSESSMENT OF PROFESSIONAL STANDARDS FOR THE RECREATION, PARK RESOURCES AND LEISURE SERVICES BACCALAUREATE CURRICULA.

ABSTRACT

Given the limited research regarding recreation accreditation and its perceived effects on educational outcomes relative to professional job placement for recreation curricula graduates, it was the purpose of this study to address the following question: "Which professional standards for Recreation, Park Resources and Leisure Services baccalaureate curricula can be used to evaluate educational outcomes needed for graduates to secure recreation positions in a changing society and changing job market?"

The descriptive statistics of the mean, median, mode, standard deviation and the standard error of the mean were employed where appropriate. The mean was used as the primary test of the research question of relevance. The mean, mode, standard deviation and standard error of the mean were used as supportive tests. The ANOVA technique was employed to the independent variables (3 groups) in relation to the dependent variables (core standard scores) to determine whether significant differences existed within/between groups. ANOVA was also used to determine if individual statements were significant. The Kruskal-Wallis Test was used as a nonparametric supportive test. A frequency distribution was employed to the independent variables to reflect a profile of the respondents' geographic location.

Within the limitations of this study, the following conclusions appear to be justified for the population studied: (1) the core standards are relevant and valid to requirements needed for graduates to secure entry-level recreation positions as measured by the sample population; (2) there is a difference in attitudes of the Past-Presidents of AALR and SPRE towards the perceived effects of accreditation in the areas of: students; organization and administration; areas, facilities, equipment and instructional materials and resources; (3) there is a difference in attitudes toward the perceived effects of accreditation.

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Wednesday, April 15
2:00-3:15 p.m.

GENDER DIFFERENCES IN THE SPORT SOCIALIZATION PROCESS OF HIGH SCHOOL VARSITY ATHLETES.

Linda Lander and Carol L. Durentini, Bowling Green State University.

The purpose of the study was to determine gender differences in the sport socialization process of high school varsity athletes. The study examined: 1) the direct and secondary patterns of sport involvement by significant others; and 2) the primary sources of motivation for entrance into sport and continued sport involvement. A 96 item Sport Participation Questionnaire was administered to male (n=119) and female (n=75) high school varsity athletes. Selected questionnaire items were analyzed with chi-square. Results indicated that there were gender differences in the reported participation of sisters in recreational physical activities. More females (47%) than males (21%) reported that their sisters frequently participated in physical activities during childhood. More females (35%) than males (17%) reported that their sisters currently participate in physical activities on a frequent basis. Gender differences were also found in the reported childhood participation of friends in physical activities. More males (72%) than females (54%) reported that their friends participated daily. Differences were found in the perceived degree of direct sport involvement of sisters with the athlete. More females (27%) than males (7%) reported that their sisters frequently participated in sports with them. Gender differences also existed in the degree of secondary sport involvement of sisters and friends. More females (29%) than males (19%) reported that their sisters were 'highly interested' or 'avid fans.' There was a difference in the role of socializing agents in providing the primary motivation for athletes' entrance into sport. Females (41%) reported that they were self-motivated to begin participation; males (33%) reported that their parents provided the primary motivation to enter sport. There were no gender differences in the role of socializing agents in providing the primary motivation to continue sport involvement. Females (34%) and males (32%) reported that they were primarily self-motivated to continue. Parents and friends, respectively, were the second and third most frequently cited sources of motivation for athletes' continued sport involvement. In summary, there are gender differences in: 1) the direct and secondary patterns of sport involvement of athletes' sisters and friends; and 2) the primary source of motivation for athletes' entrance into sport. There are no gender differences in the sources of motivation for continued sport involvement.

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Wednesday, April 15
2:00-3:15 p.m.

Emotional Exhaustion, Depersonalization and Satisfaction from Leisure Activities in Professionals in Leisure Services.

Stephen Nagy, Ph.D. & J. Thomas Chesnutt, Ph.D., The University of Alabama.

Research has identified service-oriented occupations as a risk factor for professional burnout. Two major components of burnout are emotional exhaustion and depersonalization. As a group, leisure service professionals have not been studied with respect to these characteristics. The purpose of this investigation was a) to determine current levels of emotional exhaustion and depersonalization among recreation professionals, and b) to examine the relationship between emotional exhaustion, depersonalization and satisfaction from leisure activities. The 165 leisure service professionals listed in the Alabama Recreation and Park Society directory were the sample. Questionnaires were mailed to this group, followed by a reminder phone call three weeks later. This produced a responding sample of 104 (63%) within which males and females were evenly divided. Measures of emotional exhaustion and depersonalization were conducted in accordance with the recommendations by the Maslach Burnout Inventory (MBI). These variables were measured on both intensity and frequency scales. Results indicated moderate to low emotional exhaustion and depersonalization. Satisfaction from leisure activities was determined by the Leisure Satisfaction Scale (LSS). Of the six scales within this instrument, all scales were positively and significantly related ($p \leq .05$) with ranges from $r=.55$ to $r=.22$ utilizing Pearson Product correlations. When coupled with emotional exhaustion and depersonalization, few consistent patterns emerged. The most consistent relationship was between the relaxation LSS scale and the burnout measures with values ranging from $r=-.20$ to $r=-.26$. As may be expected, these were negative correlations indicating that individuals who were high in burnout did not participate as much in relaxing activities and vice versa. Conclusions imply that relaxing activities may reduce job burnout. Further investigation is necessary to establish whether buffers for job burnout may be developed through the inclusion of relaxing activities into one's lifestyle.

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Wednesday, April 15
2:00-3:15 p.m.

THE EMERGENCE OF THE CALIFORNIA INTERSCHOLASTIC FEDERATION AND THE CONTROL OF SECONDARY SCHOOL ATHLETICS IN CALIFORNIA, 1890-1915.

Roberta J. Park, University of California.

Although numerous studies have investigated the rise of intercollegiate athletics in turn of the century America, far less is known about the evolution of interscholastic athletics. This paper examines the emergence of secondary school athletics in California between 1890 and 1915, with particular emphasis on the ultimate formation of the California Interscholastic Federation (CIF), the organization which has governed high school athletics for more than seven decades. A wide range of sources were consulted: State Board of Education Bulletins; reports of various school districts; reports of the California Teachers' Association; the Sierra Educational News; league handbooks; reports of the Pacific AAU; newspapers; various ephemera. The same impulses which prompted the formation of organizations like the New York Public Schools Athletic League found roots early in California. By the 1880s, many high schools could boast baseball, track and football teams which were far superior to those of the normal schools and colleges. An Amateur Athletic Association was organized in the San Francisco Bay Area in 1890. By 1894, high school boys' athletics had become so extensive that authorities established the Academic Athletic League of California (AALC), which affiliated with the Pacific Association AAU. Although membership was open to all secondary schools in the State which would adhere to the AAU definition of "amateur," schools in the Los Angeles area affiliated with the AAU of Southern California and formed the Athletic Council of Southern California (ACSC). By 1909, membership of the AALC extended from Fresno in the south-central part of the State to the Oregon border. The 1907 Northern California track championship attracted 2300 spectators. Tournaments were also held in boys' cross-country, swimming, football, baseball, basketball, and tennis; and girls' basketball and tennis. In 1907 efforts were made to join the AALC with the ACSC to "...form an organization for the conduct and control of state championships." While there were several reasons for this effort, the two most important had to do with holding championships which were truly state-wide and preventing excesses which some commentators believed were creeping into high school athletics. (Pomona High School, champion of the southern California league, had challenged Oakland High School to a basketball game to determine the "championship of All-California"; Berkeley High School had traveled as far as Seattle for a competition.) By 1914 the league which would henceforth govern all high school athletics in California--the CIF --had been formed.

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Wednesday, April 15
2:00-3:15 p.m.

THE EFFECT OF GENDER ON ENTRY LEVEL LEISURE SERVICE EMPLOYEE SELECTION. Timothy D. Schroeder, Northern Arizona University.

The purpose of this study was to assess the impact of gender discrimination on employee selection for entry level positions in public leisure services. Three entry level positions were examined. Job descriptions were developed for three ficticious positions with municipal parks and recreation departments: Community Center Director, Sports and Athletics Coordinator, and Arts and Crafts Supervisor. Six fictitious resumes were developed for each position, each meeting all the general minimum qualifications for its particular position. The resumes were designed so that two resumes for each position were more highly qualified than the other four. The subjects were municipal parks and recreation directors of cities between 10,000 and 50,000 population. The subjects were randomly divided into two groups, with 96 subjects in each group. The subjects were each mailed a packet containing the three job descriptions and the resumes of six ficticious candidates. They read each position description and then rated the qualifications of the candidates on a scale of 1 to 10 (10 being highest). They were instructed to use the standards they would use in filling a similar position in their own agencies. The effect of gender on the ratings was measured by changing the gender of one candidate for each position. The gender of one of the candidates expected to be rated high was differentiated between groups by sesignation of the chosen name, such as Michael/Michelle or Paul/Paula. Thirty-six responses were received from Group A and 42 from Group B, for an overall response rate of 40.6 percent. The ratings for each experimental candidate were recorded along with the gender of that candidate. The investigator also rank ordered the six candidates for each position, based upon the ratings of each respondent. The ratings of each candidate were compared between groups using t-tests. The rankings between groups were compared using the chi-square. The results showed no statistically significant differences between the rankings or ratings between the two groups. This supports the conclusion that gender discrimination is not an overall significant factor at the entry level in public leisure services. The results in no way imply that gender discrimination does not exist, only that its overall effect is not significant. Part of the lack of significant results may be due to the high variation in the ratings given the candidates. The standard deviations were all in excess of 1.60, fairly high on a 10 point scale. Better development of the resumes might have resulted in more consistent ratings, thus lowering the variance.

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**Wednesday, April 15
2:00-3:15 p.m.**

UNIVERSITY EXTENSION'S ROLE IN ASSESSING AND MEETING THE INFORMATION NEEDS OF MUNICIPAL RECREATION PERSONNEL: A REPLICATION AND EXTENSION.

Emilyn A. Sheffield, University of Missouri-Columbia; Glenn Weaver, University of Missouri-Columbia.

Models of information dissemination and technology transfer have received increasing attention as the strategic management of information has become a critical concern. Havelock's (1968, 1972, 1973) linkage model, with its acknowledgement of information transaction, context specificity, and a permanent link agent, provided the theoretical basis for this study. In this two phase research effort, municipal recreation managers were surveyed to determine needed educational services and research data. Participants were asked to respond to forced choice items regarding the relative importance of research development, research dissemination (content and format), and advocacy to be conducted by university extension personnel. Research data and advocacy were viewed as more important than workshops and educational materials. Respondents also prioritized fiscal management, salary, and fee structure data needs. Open ended responses generated prioritized workshop topics and educational needs in the following areas: revenue development and fiscal management, interaction with park boards and commissions and innovative programming ideas. In 1986 the original study (1983) was replicated and extended to ascertain the preferred format for information dissemination and the content of continuing education curricula. A demographic section was added to aid in the interpretation of these data. The results derived from this study will be discussed in three areas: stability of continuing education requirements, emerging information needs, and a research based model for continuing education from municipal recreation professionals.

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Wednesday, April 15
2:00-3:15 p.m.

CHILDREN'S SOCIALIZATION INTO SPORT: A REPLICATION. Christine L. Standefer, University of Illinois, Cynthia L. Pemberton, University of North Dakota, Mary E. Rudisill, University of Houston.

Previous research concerned with the sport socialization process clearly documents the existence of gender differences, beginning at a very early age (Greendorfer, 1983; Snyder & Spreitzer, 1973). The literature suggests that these differences may be related to gender role appropriate notions that parents inadvertently introduce into childhood socialization, particularly with respect to play, games and sport. However, parents are not the only agents of sport socialization. Siblings, peers, teachers and coaches also influence the process (Greendorfer & Lewko, 1978; Weiss & Knoppers, 1982.

Despite the research interest in the sport socialization process during the 1970s, findings are contradictory and there has been little interest in replication. Therefore, the primary purpose of this investigation was to replicate the study of Greendorfer & Lewko (1978) on children's socialization into sport. In light of previous findings, it was hypothesized that family members, more specifically fathers, were the most significant predictors of male and female sport participation, followed by the peer group and teachers, respectively.

A Sport Interest Inventory, validated by Greendorfer & Lewko (1978), was administered to 284 (144 males and 140 females) fourth, fifth, and sixth grade students between the ages of 9 and 12 years to determine the influence of significant others (father, mother, brothers, sisters, peers, teachers and coaches) on their level of sport participation.

Findings from stepwise multiple regression analyses revealed that peers and fathers, respectively, were significant predictors for both males (F (2,144) = 19.79, $p < .001$, 22% variance) and females (F (2,140) = 50.26, $p < .001$, 42% variance). These findings are in contrast with previous literature that suggests the family is the primary agency of sport socialization. Discussion focuses on the implications of these findings.

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Wednesday, April 15
2:00-3:15 p.m.

SPORTS AND SUBSTANCE USE/NON-USE: BELIEFS AND REPORTED BEHAVIORS OF ADOLESCENTS. Mary Frances Stuck, SUNY-OSWEGO, M.Ware, SUNY-Cort.

This paper explores the popular notion that sport and clean living go hand in hand through a qualitative study of beliefs and behaviors vis-a-vis drinking and drug taking as expressed by a sample of adolescents, both athletes and non-athletes. The data for this study were taken from that collected as part of a larger set of interconnected research projects funded by the National Institute of Justice. These projects were conducted by the author and others at the Interdisciplinary Research Center for the Study of the Relations of Drugs and Alcohol to Crime and involved extensive interviews with a stratified sample of adolescents from a northeastern city. Complete transcripts of onehundred extensive (3-11 hours each) interviews were content analyzed to determine what adolescent athletes (N = 60) and non-athletes (N = 40) believed and did vis-a-vis drinking, drug use, and the connection of these with sport and athletics. Specifically each adolescent's drug (including alcohol) use/non-use behavior was categorized as well as his/her reasons for using or not using various substances. It was found that many athletes as well as non-athletes used alcohol (mostly beer) and marijuana, often for the same reasons. However, most adolescents expressed belief in the "sport and clean living" myth (regardless of their own behavior). Some adolescents commented at length on their awareness of the sport-drug connection in professional sports. Some adolescent athletes reported drug use for reasons related to sport (e.g., to enhance performance or to alleviate pain in order to play.) Some adolescents reported that sport involvement did discourage or temper their drug use through providing a peer group which was supportive of non- or limited use of drugs and alcohol. The paper discusses these findings, including excerpts from the adolescents' own words, concluding with some observations and policy recommendations. Given the current media attention to the issue of drugs and sport (e.g., Len Bias's death, professional sport-drug scandals) the issue of alcohol and drug use and the adolescent athlete is an essential one for research to address. For individuals who have felt that athletes were less prone to drinking and drug-taking, this study, from a qualitative perspective, provides data which seriously question that stance. Most adolescents (athletes and non-athletes) seem to think that athletes practice "clean living" but their self-reports and experiences indicate, in rich detail, that drugs and alcohol are an everyday part of athletics beginning in junior high school.

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Wednesday, April 15
2:00-3:15 p.m.

THE RELATIONSHIP OF FAMILY SUPPORT TO FITNESS AND EXERCISE PARTICIPATION.

Ashley J. Woodcock, Peter Y. Lovejoy, Charles B. Corbin, Arizona State University; Paul Steingard, Richard Emerson, Center for Sports Medicine and Orthopedics, Phoenix, AZ.

Considerable attention has been given to the role played by family members in the sports socialization process. Studies by Orlick (1972), Snyder and Spreitzer (1976), and Greendorfer (1976) have suggested that family encouragement has been instrumental to both male and female sport involvement. While there have been numerous studies in the area of sport involvement, there has been less research carried out to look at the question of family influence on participation in general activity and the relationship of family involvement and support to physical fitness. The purpose of this study was to investigate the relationship of a measure of family support to participation in physical activity and to selected physical fitness measures. A total of 603 high school students (419 males and 184 females) were tested on a number of physical items taken from the AAHPERD Youth Fitness and Health-Related Test Batteries. These items were the 50-yard dash, sit and reach, shuttle run, sit-ups, pull-ups, long jump, and skinfolds. A Family Support Index was used based on involvement and success in physical activity for both parents and siblings. In addition a Participation Index was used based on frequency, intensity, and duration of activity. Though the relationships between the Family Support Index and several of the fitness measures were statistically significant (p= .05), the r values were low, ranging from .06 to .18 for males and .08 to .21 for females. The relationship of the Family Support Index to the Participation Index was .20 for males and .12 for females. Multiple regression analyses indicated that Family Support (with various fitness measures) contributed to the prediction of participation for males but not for females.

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Wednesday, April 15
2:00-3:15 p.m.

SOURCES OF LIFE SATISFACTION AT DIFFERENT STAGES OF THE ADULT LIFE CYCLE. Andrew Yiannakis, University of Connecticut.

It was the purpose of this investigation to examine the sources of life satisfaction at three stages of the adult life cycle. Levinson's model was used as a rudimentary framework against which the interplay of several theoretically relevant variables could be examined; these included Sport and Leisure participation (LP), Dominant Role Satisfaction (DRL), Perceived Stress (PS), Family Income (FI) and the satisfaction of Major Human Needs (MHN). The data were collected in the spring of 1985 and consist of a systematic random sample of 560 adults from New England. The information was obtained by telephone using a structured, fixed choice questionnaire. The data were analyzed using step-wise discriminant analysis.
The results reveal that persons who report a high degree of life satisfaction differ from those with a low degree of life satisfaction in as much as they spend more time with the family, they engage in more leisure activities, with greater frequency, have a higher income and more of their major needs are satisfied. Persons with a low degree of life satisfaction report experiencing a high degree of stress and anxiety from problems in personal relationships, illness, and finances. They generally do not feel very good about themselves and their need for variety and stimulation, companionship, safety and personal security are not adequately met. While clear patterns are evident in terms of the relative contribution of different variables over the life cycle, life satisfaction appears to be, primarily, a function of degree of satisfaction with one's dominant role in life. This is closely followed by family and companionship needs. Leisure pursuits, while making a significant contribution to life satisfaction do not appear to be the most important contributor. However, they appear to enhance and enrich the quality of life at all stages of the adult life cycle.

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Wednesday, April 15
2:00-3:15 p.m.

PREDICTION OF HEAD VOLUME. M. Daniel Becque, Charles Marks, Victor Katch and Komei Hattori
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The purpose of this experiment was to develop regression equations to predict head volume and to examine the relationship of head volume (HV) to total body volume (BV). Ten craniometric measurements, head volume including the neck up to the larynx by water displacement and BV by underwater weighing were determined for 58 males (age, 23±0.7; height, 178.3±1.0; weight, 75.8±1.5; fat%, 13.8±0.7) and 42 females (age, 25±0.7; height, 164.1±1.1; weight, 61.7±2.0; fat%, 25.0±1.4). Male HV (4.7±0.1 l) is significantly greater ($p<0.01$) than female HV (3.9±0.1 l). As a percent of total body volume, male head volumes range from 5.5% to 8.6% and female head volumes range from 4.3% to 9.1%. Stepwise linear regression was employed to generate both sex specific and combined equations. For males, head circumference and body weight correlate $r=0.87$ with SSE=±0.208 l. For females, head circumference, height and face length correlate $r=0.92$ with SSE=±0.137 l. For the combined sample, head circumference, gender and body weight correlate $r=0.93$ with SSE=±0.208 l. Cross-validation of the sex specific equations yield $r=0.90$ and $r=0.78$ with SSE=±0.222 l and SSE=±0.206 l and total errors of 0.211 l and 0.244 l for males and females, respectively. The combined equation was equally valid, $r=0.93$, SSE=±0.246 l and total error=0.239 l. The magnitude of the SEE for head volume is comparable to the SEE for prediction of residual lung volume (≈±0.224l). Thus, it is possible to perform densiometric measurements with prediction of HV for subjects who cannot submerge their head with an error of the same magnitude as the error in prediction of residual lung volume.

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Wednesday, April 15
3:45-5:30 p.m.

COMPARISON OF CRITERIA USED TO SELECT "TRUE" UNDERWATER WEIGHT DURING HYDROSTATIC WEIGHING AT RESIDUAL VOLUME.

Dale Bonge and Joseph E. Donnelly, Kearney State College.

The purpose of the investigation was to compare the standard criteria of "true" underwater weight of the mean of trials 8, 9, and 10 to the criteria a) the mean of the first three consecutive trials to have a range of 100g or less (3 ROW) b) the mean of the first three trials, not necessarily consecutive, to have a mean of 100g or less (3WIN). The subjects were 28 males and 31 females (x = 42.7 ± 8.0 yr) who had never experienced hydrostatic weighing (HW) and were free from know pulmonary disease. Ten trials of HW at residual volume (RV) were preformed by each subject. RV was determined in duplicate by oxygen dilution. No signficant differences were found for underwater weight between the criteria 3 ROW, 3 WIN, and the mean of trials 8,9, and 10. The mean and standard deviation for underwater weight for 3 ROW, 3 WIN and the mean of trail 8, 9, and 10 was 1151 ± 1319, 1150 ± 1325, and 1133 ± 1303 respectively. Correlation coefficients between the three criteria were r = 0.99. Intra-individual variation differed by less than 5 grams for each criteria. The criteria of 3 ROW and 3 WIN were satisfied in an average of 4.1 ±1.4 trials. These results suggest that criteria 3 ROW and 3 WIN produce similar results as the mean of trials 8, 9, and 10 and may save time and effort while facilitating subject compliance.

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Wednesday, April 15
3:45-5:30 p.m.

RELIABILITY AND VALIDITY OF ELECTRICAL IMPEDANCE FOR DETERMINATION OF BODY COMPOSITION.

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The purpose of the present investigation was to determine the reliability and the validity of the electrical impedance technique for estimating body composition in a wide range of subjects. The body compositions of 286 subjects (68 males; 218 females) between 14 and 57 years were determined by hydrostatic weighing and with the electrical impedance technique (BIA, R.J.L. Systems). Thirty six females and 18 males also completed a test re-test series exactly 24 hours apart. Correlations for all variables, including hydrostatic body fat (%F-H) and BIA body fat (%F-BIA), were highly reproducible in both sexes. The reliability correlations coefficients for the %F-H and %F-BIA values were 0.97 and 0.97 for the males and 0.98 and 0.95, respectively, for the females. A dependent t-test revealed no significant ($p>0.05$) differences between any of the variables measured during test 1 compared to test 2 values. Validity coefficients between the %F-H and %F-BIA values were 0.75 for all males and 0.77 for all females. The dependent t-test revealed that the %F BIA values were ($p<0.05$) lower than the %F-H values for both the males and females. Included in the total group were subgroups of 26 triathletes and 83 high school female runners. The validity coefficients between techniques for these subgroups were lower than those obtained for the entire sample (e.g., the valditiy coefficient in the high school female runners was reduced to 0.59). Although the valdiity of the BIA technique is within acceptable ranges when calculated for large, heterogeneous groups of males and females, it appears less valid for more homogeneous groups. Further investigation of the applicability of this technique appears warranted.

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Wednesday, April 15
3:45-5:30 p.m.

PHYSIQUE COMPARISONS BETWEEN MALE OLYMPIC HIGH, LONG, AND TRIPLE JUMPERS. J.E.Lindsay Carter, San Diego State University; Andre L. Travill, University of the Western Cape.

The purpose of this study was to compare the size, skinfolds, proportions and somatotypes of male Olympic high, long and triple jumpers. Age and anthropometric data were available for 24 high (H), 15 long (L) and 21 triple (T) jumpers (J) from the Rome, Mexico City and Montreal Olympics. Original variables consisted of 5 lengths (L), 4 breadths (B), 2 girths (G), and 4 skinfolds (SK), and derived variables were summed skinfolds (S4), proportionality z-scores using the Ross-Wilson "phantom" (P), and Heath-Carter somatotypes (S). There were no differences on age (overall X=23.3 yr), or S. The overall mean S=1.7-4.6-3.4, and 40% were ecto-mesomorphs. Mean heights were 187.5 cm, 178.5 cm, and 180.5 cm, and mean weights were 77.1 kg, 69.0 kg, and 72.1 kg for H, L and TJ respectively. HJ were greater in height, weight, 3 segment L, 2 limb B, and S4 than L and TJ. TJ were larger than LJ on lower extremity L and calf G. Discriminant analysis showed that the variables femur B, triceps SK, lower extremity L, sitting height, foot L, upper extremity L, thigh G, weight and biiliac B, were able to correctly classify 81% of TJ, 75% of HJ, and 60% of LJ (Wilks' Lambda =0.38). There were fewer proportional than absolute size differences between HJ versus L or TJ. HJ were proportionally smaller than LJ in sitting height and biacromial B, less than L or TJ in thigh G and foot L, and less than TJ in arm G. LJ were greater than H or TJ in biacromial B, and less in lower extremity length. These findings show absolute and proportional size differences between HJ and L and TJ, although they were similar in age and somatotypes. The data provide a quantitative basis for better understanding of physical structure and the biomechanics of performance.

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Wednesday, April 15
3:45-5:30 p.m.

FITNESS AWARDS: SUCCESS RATES FOR SELECTED TEST BATTERIES. Charles B. Corbin, Peter Y. Lovejoy, Arizona State University; Paul Steingard, Richard Emerson, Center for Sports Medicine and Orthopedics, Phoenix, AZ.

Considerable recent attention has been focused on various awards schemes associated with physical fitness testing (Simmons, 1986). One of the important questions is whether awards presented to children achieving predetermined normative standards serve as effective motivators for immediate and long term fitness improvement. The purpose of this study was to determine the extent to which children were capable of earning awards for performances on tests in the batteries used at the national level. A total of 2312 subjects ranging in age from 13 to 19 participated in the study. Data were collected as part of a longitudinal fitness and medical project in a large metropolitan area. Each subject was administered all items (except the cardiovascular fitness items) in the AAHPERD Youth Fitness, the AAHPERD Health Related Fitness, and the new PCPFS Fitness Test Batteries. Calculations were made to determine how many subjects met the criteria for earning the PCPFS 85%ile award on the Youth Fitness test and the new PCPFS Test. Also calculated were the number of subjects meeting the criteria for earning current Health Related Fitness Test Awards (75%ile all tests except skinfold and 50%ile for skinfold) and for earning the 50%ile and 80%ile awards endorsed by AAHPERD for the Youth Fitness Test. Results indicated that when national norms were used less than 1% of subjects earned awards at the 85%ile level. Significantly more earned the 50%ile award than other awards and females earned significantly more awards than males, especially at the older age levels (15.57% for females vs. 6.13% for males). More people earned the Health Related Fitness Award than the 85%ile awards (2.69% of males and 10.10 of females). Fewer than 1% earned the 85%ile awards even when local norms were used and only 7.69% of males and 7.85% of females earned 50%ile awards when local norms were used. Results suggest that the motivational value of awards must be questioned when so few of those taking the tests can earn awards.

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Wednesday, April 15
3:45-5:30 p.m.

DEVELOPMENT AND VALIDATION OF A BADMINTON CLEAR TEST.

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The purpose of this study was to develop a valid and reliable badminton clear test to be used with male and female beginning badminton students. The experimental test was administered to sixty-one male and sixty-five female students enrolled in seven beginning badminton classes at Georgia Southern College. An expert in badminton and the instructor for each of the seven classes independently ranked each student on his/her ability to hit a deep clear. The experimental test consisted of two warmup strokes followed by 20 trials. An administrator served high, deep serves into the clearing zone. The clearing zone for males was a four-by-eight foot rectangle at the back of the court. The zone for females was the same size, but two feet closer to the net. Inaccurate serves were repeated. The other court was divided into seven scoring zones with an eight-foot high rope extending across the court 13½ feet from the net. After testing was completed, scores were tallied using four different scoring systems and for 10, 15, and 20 trials. The system later selected as the most desirable test consisted of four scoring zones extending two and one-half feet, five and one-half feet, and eight and one-half feet from the end line. The fourth zone extended one foot beyond the end line. The point values of the four zones were five, four, two, and four, respectively. Birds failing to clear the eight-foot rope counted zero. When the results were correlated with the two criteria, judge's rating and teacher rating, little difference was found among the four scoring systems. The system selected correlated slightly higher and was the easiest system to administer. The multiple correlations for 10, 15, and 20 trials were .85, .89, and .91 for males, and .85, .91, and .92 for females. Intraclass reliability coefficients for 10, 15, and 20 trials were .87, .88, and .93 for males and .89, .91, and .95 for females. Considering the high validities, the high reliabilities, and the economy of time when using 10 trials, it was decided that the test need consist of only 10 trials.

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3:45-5:30 p.m.

INITIAL EFFECTS OF VERY LOW CALORIE DIET AND EXERCISE ON BODY COMPOSITION PARAMETERS AND STRENGTH. Joseph E. Donnelly and Dennis Jacobsen, Kearney State College.

The purpose of the investigation was to determine initial effects (22d) of a very low calorie diet (VLCD) and exercise on morbidly obese adults ($\bar{X}$% fat=43.6±7.0). Thirteen females and four males ($\bar{X}$=38.1±9.3 yr) underwent medical and psychological screening and gave informed consent. VLCD was a liquid ingested 5x/d. Caloric intake per day was 500Kcal and consisted of 50 gm protein, 79 gm carbohydrate, 1 gm fat, and RDA vitamins and minerals. Body composition parameters were determined by hydrostatic weighing at residual volume. Strength was determined by 1RM for bench press (BP), lat pull down (LAT), knee flexion (KF), knee extension (KE), 30 sec. sit-ups (SU), and grip strength (GR). Aerobic exercise was performed 4d/wk for 30m at an intensity perceived by each subject as somewhat hard (#13 Borg). Strength training was performed 3d/wk, at 70% 1RM, 2 sets, 6-8 reps using BP, LAT, KF, KE, and SU. The results indicated that mean body wt. decreased 13.1 kg, fat wt. decreased 10.0 kg, lean body mass (LBM) decreased 3.1 kg, body density increased 0.0078 g/ml, and body fat decreased 3.5% ($p<.03$). Seventy-six percent of the wt. loss was fat and 24% was LBM. Mean 1RM for LATS, KF, KE were not significatly changed ($p>.05$). Mean 1RM for BP was decreased, while mean scores for SU and GR were increased ($p<.03$). The results suggest that rapid initial weight loss is possible without extreme skeletal muscle wasting and strength loss when aerobic and strength training is combined with VLCD.

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Wednesday, April 15
3:45-5:30 p.m.

BODY COMPOSITION AND FLEXIBILITY AMONG PREPUBESCENT MALES AND FEMALES. Carl Gabbard and Richard Tandy, Texas A&M University.

While the literature presents an array of findings related to flexibility, general consensus is that females are more flexible than males from 5 years to adult (e.g., Phillips, 1955; Kirchner & Glines, 1957; Clark, 1975; Di Nucci, 1976). Speculation as to the sex difference has suggested physical activity patterns and the fact that during adolescence, as the size of muscle groups (i.e., body surface area) in males increase, flexibility may decrease (Krahenbuhl & Martin, 1977). It has also been suggested that during this same phase of growth, girls acquire increases in fat rather than muscle tissue, thus maintaining a greater range of motion (e.g., Zaichkowsky et al., 1980). Most scientists agree that the qualitative data explaining sex differences, especially during preadolescence, when body size characteristics are similar, is insufficient. The thrust of this inquiry focused upon the relationship between body fatness (selected skinfold measures) and performance on the sit-and-reach flexibility test among prepubescent males and females. Information related to ligament and hormonal sex differences were also explored. Measures of age, height, weight, skinfold thickness at four sites (triceps, subscapular, umbilical, thigh) and performance on the flexibility test were obtained on 179 5-and-6-year old children. Results of the ANOVA procedures indicated that there was not a significant difference between sexes in age, weight, and height. Comparisons of skinfold data revealed significantly ($p<.001$) larger measurements for females at all four sites, as well as superiority on the flexibility test ($p<.0001$). Multiple linear regression equations using flexibility as the predicated variable indicated that females (SEX) will have greater flexibility and as AGE increases, flexibility decreases. Overall interpretation of regression analysis suggested that the presence or absence of fat at the four measured sites had little to do with flexibility for either sex, indicating that other contributing factors were present. Speculation as found in the literature regarding other possible contributing factors (i.e., biological and cultural) were also discussed.

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Wednesday, April 15
3:45-5:30 p.m.

A COMPARISON OF BODY COMPOSITION DETERMINATIONS AT TWO HYDRATION LEVELS USING BIOELECTRICAL IMPEDANCE ANALYSIS (BIA).

Lonn Hutcheson, Richard W. Latin, Kris E. Berg; University of Nebraska at Omaha; Earnest Prentice, University of Nebraska Medical Center.

The purpose of this study was to determined the influence of body hydration on BIA assessments of body composition. Thirty four male subjects had criterion measures of body composition determined by hydrostatic weighing (HW), with residual volume assessments made on-land by the O_2 dilution method. Prior to data collection, urine specific gravity was obtained from each subject to insure euhydration at the outset of the study. Each subject had measures of body composition determined by BIA in a euhydrated state (BIA-H). Following a 2% weight (sweat) loss induced by saunaing, BIA measurements were repeated (BIA-D). One way repeated measures ANOVAs revealed the following results:

	BIA-H	BIA-D	HW
Percent Body Fat (%)	13.9	12.2	12.7
Lean Body Weight (kg)	66.2	66.2	67.1

—— NSD $p > 0.05$

A Pearson correlation of r = .62 between HW and BIA-H was also computed. These data indicate that when measuring the PBF of lean males the BIA has only a moderate level of validity when compared to HW. Furthermore, HW and BIA-H determinations of PBF differed, while HW and BIA-D did not. Measures of LBW by HW differed from both BIA conditions, while the determinations of LBW by BIA were identical to one another. This similarity may be interpreted as an inability of the BIA to account for the 2% body water loss. Although only a 2% reduction in body water was induced in this study, it could be speculated that further reduction would lead to a greater error in measurement of both PBF and LBW. It was concluded that hydration levels are an important factor in BIA determinations of body composition and even under euhydrated conditions results will differ from HW.

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Wednesday, April 15
3:45-5:30 p.m.

AGE: A CRITICAL FACTOR IN FITNESS TEST PERFORMANCE

Peter Y. Lovejoy, Charles B. Corbin, Arizona State University; Shirley Carpenter, Kay Wing, Phoenix General Hospital.

The revision of the various AAHPERD Physical Fitness Batteries as well as the introduction of several new state and national fitness tests has drawn attention to potential problems associated with the use of norms as the basis for individual comparisons of fitness test results (Simmons, 1986). It is argued that norms discriminate against those who mature late and those who are relatively young for their age classification. When norms are used for grading, awards, or interpersonal comparisons problems, could arise if these arguements are correct. The purpose of this study was to assess the extent to which age in years and subclassifications of age within years are associated with performance on fitness test items currently used in national fitness test batteries. Subjects for the study were 1366 male and 627 female high school students who were tested as part of a five year longitudinal study of fitness. All subjects lived in a large metropolitan area. In addition to an extensive medical exam, each subject performed all of the items (except the tests of cardiovascular fitness) of the AAHPERD Youth Fitness Test, the AAHPERD Health Related Fitness Test, and the test proposed (as the new national test) by the President's Council on Physical Fitness and Sports. Results (ANOVA) for males indicated that significant main effects existed among age groups (age in years) for performance on all tests except skinfolds. For females, differences existed only for the long jump and sit and reach. Significant main effects existed for subclassifications of age groups (quarters of years within years) for males on four of the seven tests. No age group within age differences existed for females. Results indicate that age group norms favor older children within age group classifications among males but not among females.

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Wednesday, April 15
3:45-5:30 p.m.

CONSTRUCTION OF TESTS IN THE COGNITIVE AND PSYCHOMOTOR DOMAINS FOR SKIN AND SCUBA DIVING. Jean J. McCarthy, Mankato State University.

The purpose of this study was to construct mastery tests in the cognitive and psychomotor domains for sport diving. In addition, the study was designed to determine validity and reliability and to evolve workable and practical scoring and administrative procedures for the tests. Tables of specification for each domain, cognitive and psychomotor, and subsequent pilot study of initial test batteries refined the tests into their final forms for analysis. Two-trial data were collected from 104 male and female students enrolled in a college-level skin and scuba diving course and analyzed for test reliabilities and validities. Reliability claims for the alternate forms of the cognitive test were supported by a coefficient of equivalence (r=.784) and Cronbach Alpha coefficients of homogeneity (r=.772, r=.792). Content validity derived from item generation from an authority-based table of specifications and from an item analysis that showed the majority of the items to be within limits recommended by experts for a mastery test. Reliability for the two skin-diving tests (underwater distance swim, mask-and-snorkel clearance) and the three scuba-diving motor tests ("bail-out," "ditch-and-don," "buddy switch") was determined by intraclass correlations (r=.797 to r=.815). Content validity for the five motor tests was established by an authority-based table of specifications, and construct validity by nonsignificant _t_ tests of means between the main study's subjects and a sample of experienced divers. Further, low inter-item relationships (r=-.138 to r=.571) were observed. Cutting scores for domain mastery were suggested. Results produced tests in the cognitive and psychomotor domains for sport diving that can evaluate diving skills adequately with one trial and that are an administratively feasible mastery test battery.

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Wednesday, April 15
3:45-5:30 p.m.

STRENGTH AND RELATIVE ENDURANCE AS INFLUENCED BY STRENGTH LEVEL, TYPE OF EXERCISE AND SIZE OF MUSCLE GROUP.

Jack K. Nelson, Ronald J. Byrd, John Tew, Peter Sciacchetano, Louisiana State University

Studies which have investigated the relationship between strength and relative endurance have generally found either a negative r or no relationship. Authors have attributed these results to the type of exercise (static or dynamic), physiological causes such as greater occlusion of the blood flow in the stronger muscles, motivational factors and the inability to obtain accurate maximal strength scores. This study sought to look at the problem using different muscle groups, a large and a small, different types of exercise, dynamic and isometric. It was hypothesized that if some generality of relative endurance was found, it may have both physiological and motivational implications. Male college students (N=60) were tested on an isometric and a dynamic bench press using the Cybex Isokinetic Dynamometer and an isometric and dynamic hand and finger squeezing exercise using the Physiogrip. Both of the instruments were interfaced with a microcomputer for scoring. In all, four separate tests were given. Every effort was made to establish a maximal strength score through orientation, practice, and the use of an average of the two highest initial scores as maximal strength. Each endurance bout was for 1 min. In the isometric exercises, readings were taken every 5 sec. The cadence for the dynamic bouts were regulated by a metronome. The results supported previous studies when correlations between strength and relative endurance were run over all subjects. Generally, low insignificant r's were found. However, when subjects were placed into extremely strong, average strength and low strength groups, the relationship shifted dramatically to a positive one in three of the four tests. The very strong subjects had significantly higher relative endurance, especially over the last 15 sec of exercise than the medium and weaker subjects in the isometric bench press, and the isometric and dynamic finger tests. The very strong subjects averaged 83% and 78% relative endurance in the dynamic and isometric tests, respectively. In terms of strength decrement indices, the very strong subjects averaged only 29% loss, as compared to 42% and 49% for the medium and low strength groups, respectively. Significant, moderate correlations were found among the relative endurance scores in the four exercises. The very strong subjects exhibits marked generality in the endurance performances.

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Wednesday, April 15
3:45-5:30 p.m.

FIELD TESTING A NEW MODIFIED CURL-UP TEST FOR THE ABDOMINAL MUSCLES WITH MIDDLE SCHOOL STUDENTS.

Loarn Robertson, Portland State University; MaryLynn Cunningham, Brooklyn Veterans Administration Medical Center; Rene Changsut, Portland State University.

Previous experiments with a new modified curl-up test (CUT) and a standardized modified sit-up test (SUT) suggested that CUT was a more sensitive indicator of abdominal muscular function than SUT for young healthy adults. This study examined the reliability of using CUT with middle school students in a field testing situation. Subjects were 35 boys ($\bar{x}$ age = 12.17 yrs) and 45 girls ($\bar{x}$ age = 12.13 yrs). Testing was conducted during regular physical education classes and subjects were paired-off and divided by sex. Between 10 and 14 subjects were tested in any single test session. CUT procedures were explained and demonstrated to all subjects who then had a short warm-up period followed by a 1 minute test. Using the aforementioned procedures subjects had 1 practice test day (T_1) followed by 2 separate test days (T_2 and T_3). An intraclass correlation analysis (R) was used to establish reliability from the data collected on T_2 and T_3. Using a 1-way ANOVA significant differences were found between test days (T_2 and T_3) for boys $F(1,34) = 11.47$, $p < .01$ and girls $F(1,44) = 18.75$, $p < .001$. The intraclass correlation coefficient for boys was $R = .80$ and for girls was $R = .85$. Observations suggested that individual postural variations in test performances may be responsible for fluctuations in test scores. Specifically, a curling action as required in the CUT protocol was initially difficult to perform for some subjects. Results suggest that more practice with CUT is required in order to minimize between-day differences. It was concluded that using CUT as a field instrument for testing abdominal muscular function with middle school students has merit and warrants further study.

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Wednesday, April 15
3:45-5:30 p.m.

THE EFFECT OF EXERCISE UPON BODY COMPOSITION IN PRE AND POST-MENOPAUSAL FEMALES, AGED 35-70 YEARS.

G. S. Schaberg, J. E. Ballard, The University of Texas at Tyler; B. C. McKeown, The University of Texas at Arlington; and S. A. Zinkgraf, The University of Texas Health Center at Tyler.

Several studies reported that due to an increasingly sedentary lifestyle aging women increase in fat weight (F WT) and percent fat (% F) as well as decrease in body density (BD) and fat free weight (F F Wt). The purposes of this study were: 1) to evaluate the effects of regular aerobic and weight training exercise upon the body composition of premenopausal (PreM) and postmenopausal (PostM) women, aged 35-70 years, and 2) to compare the exercise (Ex) Ss with age-matched control (C) Ss. Ss for this study were 109 volunteers who comprised 4 groups: PreM Ex (n=19, $\bar{X}$ age=42.3±4.4 yrs), PreM C (n=24, $\bar{X}$ age=42.2±5.2 yrs), PostM Ex (n=36, $\bar{X}$ age=58.3±4.7 yrs), and PostM C (n=30, $\bar{X}$ age=58.5±5.7 yrs). Body composition was measured before and after 24 weeks of Ex training. Anthropometric measurements which consisted of 6 skinfolds [Tricep (t), Suprailiac (S), Abdomen (A), Subscapular (Sb), Thigh (T), and Calf (C)] were obtained with Harpenden Calipers on all Ss. Bd was estimated from hydrostatic weighing (n=94) and body fatness from Brozek's equation (1963). Ex Ss walked or jogged and lifted weights 3 times per week for 60 minutes for 24 weeks. C Ss remained sedentary. Three-way ANOVAs [Age (PreM/PostM) X Group (Ex/C) X Time (Pre/Posttest)] were performed on all variables to determine the effect of Ex training on : 1) PreM/PostM status (Age X Time Interactions and 2) Ex/C status (Group X Time Interaction). These analyses revealed: 1) there were no significant ($p>.05$) Age X Time Interactions for any variable which suggested the PreM and PostM Ss were effected similarly by the Ex training, and 2) there were significant ($p<.05$) Group X Time Interactions for BD, % F, F Wt, and S and A skinfolds. The Ex Ss became significantly less fat as evidenced by an increase in Bd (.002 g/cc) and a decrease in % F (1.2%), F Wt (.4kg), S skinfold (.3mm) and A skinfold (.3mm). On the basis of these data, it was concluded that: 1) body composition improvements were achieved to a similar degree by both PreM and PostM women. Menopausal status, therefore, did not alter the effect of Ex in this study, and 2) Ex Ss experienced improvement in BD, % F, F Wt, and S and A skinfolds. Ex training, consequently, seemed to have an inhibitory effect on the increases in F Wt and decreases in BD associated with a sedentary lifestyle.

Supported by University of Texas-Tyler Faculty Research Grant #94

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Wednesday, April 15
3:45-5:30 p.m.

PUPIL ASSESSMENT IN SECONDARY SCHOOLS - A DESCRIPTION OF TEACHER PRACTICES AND PERCEPTIONS. Mary Lou Veal, University of Houston.

Current research has revealed a substantial gap between pupil assessment theory and the practices of secondary teachers. Survey studies have yielded data about testing and grading practices in schools, but there is a need for a more thorough description of the assessment behaviors of teachers. The purpose of this study was to describe not only what teachers are doing, but also why they select and use certain practices. Naturalistic field methods were chosen to obtain a description of the assessment practices of the thirteen selected secondary teachers. At least three classes of each teacher were observed in order to see assessment taking place, and descriptions of specific assessment practices were obtained through formal and informal interviews. School documents and teacher-made assessment instruments were also examined in order to add depth to descriptions. The bulk of the data consisted of field notes of interviews and observations, which were analyzed qualitatively. Frequency indeces were also prepared to allow easier viewing of patterns in the data. Ninety specific assessment practices were identified and were labelled "instances of assessment". One instance consists of one assessment technique practiced by one teacher in a specific activity during one of the three phases of assessment. Of the ninety total instances, 16% were preassessment, 30% were formative assessment, and 54% were summative assessment. Emergent themes were also analyzed and it was found that teachers' assessment practices were influenced by the effort and improvement of their students, and that teachers individualized their assessments. Teachers also identified conditions under which they used assessment including the determination of the purpose or utility of each technique as well as efficiency of administration.

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Wednesday, April 15
3:45-5:30 p.m.

MAXIMUM OXYGEN CONSUMPTION OF TRIATHLETES DURING RUNNING,CYCLING, AND SWIMMING. Fred D. Baldini, and William A. Bynum, Human Performance Lab, California State University Sacramento.

The purpose of this study was to determine if differences exist between maximum oxygen consumption ($M\dot{V}O_2$) of triathletes during all-out running (treadmill), cycling (ergometer), and swimming (tethered) tests. Five highly trained national caliber triathletes (3 males,2 females) were measured for $M\dot{V}O_2$ during all three modes of exercise. Analysis of variance was used to test for differences using a .05 level of significance. The following mean results were obtained:

	Running	Cycling	Swimming
$M\dot{V}O_2$ ($ml.kg^{-1}.min^{-1}$)	67.70	65.62	55.77*,@
$\dot{V}E$ (L/min)	112.70	127.16	95.76
HR (beats/min)	190.4	182.2	182.2
RER	.994	1.06	.994

(* indicates significantly different from running value,$p<.05$)
(@ indicates significantly different from cycling value,$p<.05$)

Significant differences in $M\dot{V}O_2$ were observed between running and swimming and between cycling and swimming. Treadmill running produced the highest $M\dot{V}O_2$, followed by cycling (97% of treadmill value) and swimming (82% of treadmill value). The triathletes showed high levels of aerobic fitness as indicated by their $M\dot{V}O_2$ values. Others have reported similar results on triathletes in that cycling values were 96% of running, and swimming values 87% of running. When examining untrained subjects, however, it has been reported that subjects achieved 90% of running $M\dot{V}O_2$ during cycling and 80% of running $M\dot{V}O_2$ during swimming. It has been suggested that there is a specific training adaptation rather than a general training adaptation in triathletes as seen by the reduced differences in $M\dot{V}O_2$ values between running and the other activities. In a general adaptation, all values presumably would increase, maintaining the same relative differences. This data supports the suggestion that there is a specific training adaptation to multi-mode training. In addition, although the relative differences between running and the other activities decrease, $M\dot{V}O_2$ achieved running remains above the cycling and swimming values.

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Thursday, April 16
9:00-10:15 a.m.

Effect of pre-exercise caffeine ingestion on the cardiovascular responses during prolonged walking at a constant oxygen consumption. Dale D. Brown, Ronald G. Knowlton, Ronald K. Hetzler, Gary H. Kamimori. Department of Physical Education, Southern Illinois University at Carbondale.

The effects of pre-exercise caffeine ingestion on the cardiovascular system during treadmill walking were investigated. Six untrained, caffeine-naive males, mean age 20.0, with 22.2% body fat, participated in a double blind, randomized, repeated measures design. Caffeine (5.8 mg/kg lean body weight) or a placebo was ingested immediately before a 90-min walk (controlled at 40% of maximal oxygen uptake). Heart rate (HR) from electrocardiogram, blood pressure (BP), and oxygen consumption were measured at 15 min intervals. Significantly different linear trends ($p<0.05$) across time were found for systolic blood pressure (SBP) and for rate pressure product (RPP)(HR•SBP). The caffeine treatment increased SBP from 121 mm Hg at rest to 136 mm Hg during exercise; an 8% increase over the placebo treatment. Caffeine produced an increase in RPP from 9500 at rest to 14300; a 20% increase over the placebo treatment. Based on the RPP response, it was concluded that caffeine ingestion in caffeine-naive individuals increases the myocardial stress during prolonged walking.

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Thursday, April 16
9:00-10:15 a.m.

AN INVESTIGATION OF SKELETAL MUSCLE METABOLISM IN THE PRESENCE OF OVARIAN HORMONES AND β-ENDORPHIN.

Anne P. Canty, Rice University; Stephen B. Smith, Texas A&M University.

Based on implications by investigators of hormonal involvement in the variations in endurance performance in females during the menstrual cycle, the following in vitro investigation was undertaken to examine the effects of sex steroids and β-endorphin (endorphin), both of which are known to fluctuate during the menstrual cycle, on skeletal muscle metabolism. Porcine sternomandibularis muscle strips (25 to 50 mg) were incubated in triplicate in Krebs Henseleit buffer with .75 mM palmitate, 5 mM glucose, 30 mg/ml BSA and $[U-^{14}C]$ glucose or $[1-^{14}C]$ palmitate. Some flasks contained either 100 ng/ml progesterone, 1 ng/ml estradiol-17β (estradiol), or 1 ng/ml endorphin. Strips were incubated for 1 hour, after which reactions were terminated and the recovery of label from glucose in glycogen, CO_2, and lactate and the incorporation of palmitate into neutral lipids were determined. Samples incubated with estradiol resulted in increases in glycogen (89 ± 32%) and lactate (92 ± 31%) when compared to control samples. Progesterone and endorphin failed to cause significant changes in glucose recovery in glycogen, lactate, or CO_2 relative to the control condition. Lipid synthesis was not significantly affected by any of the hormonal treatments. A second experiment was performed to examine the possibility of combined effects of sex steriods and endorphin on glycogen synthesis. The addition of endorphin to flasks preincubated with progesterone or estradiol did not result in significant changes in glycogen synthesis when compared to control samples. The data suggest: 1) Steroid hormones may have a role in skeletal muscle metabolism in vivo. 2) Further investigation is needed to determine if opiate receptors are present in skeletal muscle. Thus, the role of endorphin in skeletal muscle metabolism remains unclear.

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Thursday, April 16
9:00-10:15 a.m.

THE EFFECTS OF TEN CONSECUTIVE DAYS TRAINING ON AEROBIC CAPACITY. Carol L. Christensen, Kristin Gudjohnsen, San Jose State University.

The purpose of this study was to determine the effects of a short term moderate intensity training program on aerobic capacity (i.e., peak VO2). Subjects (15 male volunteers, mean age 22 yrs) were given three tests of peak VO2 on a cycle ergometer at 40, 60, or 80 rpm. Standard open circuit calorimetry was used to determine oxygen consumption. Subjects were tested and exercised on a Quinton Uniwork Ergometer, Model 845. Subjects were assigned to one of three cycling cadences for training (40, 60, and 80 rpm) on the bases of their mean peak VO2 in an attempt to avoid initial differences between groups in peak VO2 (an ANOVA revealed no significant differences in the initial peak VO2 of the three groups). Training at one of the cadences, subjects worked at a 65 to 70% of their pretest mean peak VO2 for 1.5 hours a day for 10 consecutive days. Peak VO2 tests were repeated on all subjects following the training period. No changes in body weight were observed from pre test (mean for all subjects = 73.9 kg) to post test (mean for all subjects = 73.8 kg). Changes in peak VO2 are presented in the table below. Increases in peak VO2 from 0.2 to 9.8% were observed; correlated t-tests showed that these changes were significant in 6 of the 9 instances. These results indicate that rapid cardiorespiratory adaptations are possible within a short (ten consecutive day), moderate intensity (65 to 70% peak VO2), long duration (1.5 hrs/day) training period.

Change in Peak VO2 (ml/kg/min) following
ten consecutive days training

Training Cadence	Cadence for peak VO2 tests 40	60	80
40	2.81*	2.37*	0.1
60	2.05*	2.63*	2.46
80	4.65*	2.27	3.49*

* p<.05

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Thursday, April 16
9:00-10:15 a.m.

DECREMENT IN ANAEROBIC POWER DURING THE FIELD HOCKEY SEASON.

P.S. Freedson and S.A. Wilkie

Evaluation of in-season changes in physiological and performance measures may provide valuable information to the coach regarding the conditioning level of the athlete over the course of the competitive season. Considering the high anaerobic component associated with field hockey, the present investigation was designed to profile anaerobic characteristics at pre- mid- and post-season in 14 ($\bar{X}$ ± SD age = 18.9 ± 1.00 yrs) college varsity field hockey players. The field hockey players completed a Wingate anaerobic power test (test-retest reliability: $r = .709$ for peak 5 sec power and $r = .817$ for cumulative power) at preseason (PRE), midseason (MID) and postseason (POST). In addition, a control group (N=14) was evaluated at PRE and POST season. The coach divided the group into highly skilled (N=5) (HS) and less skilled (N=9) (LS) groups on the basis of offensive, defensive and ball handling skills, stick work and teamwork abilities. No significant changes were observed for the control group pre vs post season. A REANOVA (orthogonal polynomial) revealed a significant linear time of season by group interaction for cumulative power ($p<.05$):

CUM POWER ($\text{kgm}\cdot\text{min}^{-1}$)

	PRE		MID		POST	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
HS	2734	206.0	2832	292.1	2597	213.4
LS	2463	486.3	2535	519.1	2557	577.2

No significant time effect or interaction were observed for peak 5 sec power. These results indicate that the more highly skilled field hockey players exhibit a decrement in anaerobic power over the season while less skilled players maintain anaerobic power. Examination of anaerobic conditioning techniques, competitive season scheduling and/or frequency of substitutions in competitive games is suggested in an effort to minimize anaerobic power decrements observed among the more highly skilled players.

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Thursday, April 16
9:00-10:15 a.m.

BLOOD PRESSURE, DIET AND EXERCISE AMONG MALE AND FEMALE PRE-ADOLESCENTS IN THREE ETHNIC GROUPS

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Ethnic group differences in resting blood pressures (BPs) have been documented in adults. However, the age at which these differences begin to appear has not been well defined. As part of a study on methods for assessing diet and exercise behaviors among third to sixth grade students (N=199), BPs, estimated dietary sodium (Food Frequency Questionnaire), resting heart rate, body surface area, and estimated energy expenditure (7-Day Exercise Recall) were collected on boys and girls from three ethnicities; Anglo- (AA), Black- (BA), and Mexican-American (MA). Analyses of variance and covariance were used to assess differences across design factors in BP with estimated dietary sodium, heart rate, body surface area, and estimated energy expenditure as covariates. No differences were detected between ethnic groups in systolic pressures (SYS), but MA children had significantly higher diastolic fourth phase pressures (DIA) than AA or BA. Differences in the covariates did not account for this difference between ethnic groups in diastolic pressure.

MEANS AND STANDARD DEVIATIONS OF SYSTOLIC AND DIASTOLIC BLOOD PRESSURES IN mmHG

GENDER	GRADES		ETHNICITY		
			AA	BA	MA
MALE	3-4	SYS	98.8 (8.2)	94.8 (9.4)	97.6 (8.9)
		DIA	53.5 (10.5)	54.8 (9.6)	61.0 (8.9)
FEMALE	3-4	SYS	94.9 (9.8)	97.3 (7.4)	96.0 (4.6)
		DIA	60.9 (7.7)	60.7 (8.6)	67.3 (7.4)
MALE	5-6	SYS	96.7 (6.8)	102.8 (13.2)	98.8 (5.9)
		DIA	56.1 (12.0)	58.9 (10.1)	64.4 (9.3)
FEMALE	5-6	SYS	95.6 (7.9)	97.7 (8.1)	95.8 (8.0)
		DIA	61.3 (5.4)	63.7 (8.2)	63.4 (6.1)

* ($p < .05$)

Supported in part by a grant from the National Heart, Lung and Blood Institute.

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Thursday, April 16
9:00-10:15 a.m.

A COMPARISON OF STRENGTH AND ENDURANCE TRAINING TECHNIQUES ON THE DEVELOPMENT OF MUSCLE STRENGTH, ENDURANCE AND HYPERTROPHY.

Stephen M. Horowitz, The University of Texas at Austin.

The purpose of this investigation was to determine which of four dynamic weight training programs would produce the greatest changes in muscle strength, endurance and hypertrophy of the biceps brachii. Forty-three male Ss were assessed for biceps curl strength and relative dynamic endurance, subcutaneous fat of the biceps and triceps, and upper arm circumference. Ss were randomly assigned to either a 3-day strength (3S), 5-day strength (5S), 3-day endurance (3E), or 5-day endurance (5E) training group. A nonequivalent control group was only pre- and post-tested for the dependent variables. Testing and 6 weeks of training were done on the Universal Gym. The 5S and 3S groups performed 2 sets of 5-7 reps of an individually determined 6 RM, while the endurance groups completed as many repetitions as possible using 25% of their 1 RM. The total number of repetitions per week was equated between the 3 and 5 day groups. All treatment groups significantly ($p<.01$) increased strength and endurance with the 5S group producing the most significant gain (27.4%). There were no significant differences between the 3S (17.1%), 3E (14.4%), and 5E (17.8%) groups for strength gains. Both the 3E (118.8%) and 5E (169.6%) groups, while not different from each other, had greater endurance increments ($p<.05$) than 3S (67.2%) and 5S (31.1%) Ss. Even though no differences were found between experimental treatments, all groups yielded significant ($p<.01$) changes in subcutaneous fat and girth compared to the control group, ranging from -2.0 to -3.2 mm, and .41 to .70 cm, respectively. All treatments produced significant ($p<.01$) net hypertrophy ranging from 1.45 to 2.34 cm, although subjects training with low resistance, high repetition tended to produce greater, but non-significant improvements. This study showed that training 5 days per week produced greater gains in strength and endurance, but similar changes in subcutaneous fat, circumference and net hypertrophy compared to training only 3 days per week.

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Thursday, April 16
9:00-10:15 a.m.

BILATERAL AND IPSILATERAL ISOKINETIC LEG FLEXION AND EXTENSION STRENGTH RATIOS OF UNIVERSITY FOOTBALL PLAYERS.

Glen Johnson, Terry Housh, Leo Marty, George Eischen, and Clem Eischen, Center for Youth Fitness and Sports Research, University of Nebraska-Lincoln and Portland State University.

Imbalances in muscular strength ratios have been associated with musculoskeletal injuries in athletic populations. Therefore the purpose of this study was to determine the bilateral and ipsilateral muscular strength ratios of university football players. Fifty-five players ($\bar{X} \pm SD = 19.8 \pm 1.4$ yrs) volunteered to be measured using a Cybex II dynamometer at 180 and 300°/sec. The players were grouped into four positions based on non-significant ($p > 0.05$) differences in the measured variables: offensive backs and receivers (OB, n=14), offensive linemen (OL, n=13), defensive linemen and linebackers (DL, n=14), and defensive backs (DB, n=14). One-way ANOVA and Scheffe post-hoc comparisons indicated that for bilateral comparisons (left/right) at 180°/sec, significant ($p < 0.05$) differences were found for DL($\bar{X} \pm SEM = 1.04 \pm 0.01$) vs DB(0.97 ± 0.02) for left leg extension/right leg extension and OL(1.02 ± 0.03) vs DB(0.93 ± 0.92) for left leg flexion/right leg flexion. No bilateral differences were found at 300°/sec. The ipsilateral ratios (flexion/extension) measured at 180°/sec were DB(0.73 ± 0.03), DL(0.74 ± 0.02), OB(0.76 ± 0.03), and OL(0.81 ± 0.03) for left leg flexion/left leg extension and DB(0.76 ± 0.02), OB(0.77 ± 0.03), OL(0.80 ± 0.03), and DL(0.80 ± 0.02) for right leg flexion/right leg extension. The ratios measured at 300°/sec were OB(0.85 ± 0.01), DL(0.88 ± 0.02), DB(0.88 ± 0.01), and OL (0.90 ± 0.02) for left leg flexion/left leg extension and OB (0.86 ± 0.02), DL(0.88 ± 0.02), DB(0.90 ± 0.02), and OL(0.91 ± 0.03) for right leg flexion/right leg extension. There were no significant differences ($p > 0.05$) for any of the ipsilateral comparisons. Although statistical differences for bilateral comparisons were found for both extension and flexion movements at 180°/sec, the ratios differed by only 7 and 10% of the mean values respectively and thus are of little physiological significance. The ipsilateral comparisons were specific to the speed of contraction with fast speeds iliciting ratios closer to equity. Preseason and regular inseason evaluations can provide valuable information with respect to training status and identify those athletes with increased susceptibility to muscular injury. These results provide data for clinical evaluations or comparative investigations of similar and divergent populations.

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Thursday, April 16
9:00-10:15 a.m.

FACTOR ANALYSIS OF VARIOUS ANAEROBIC POWER TESTS. James M. Manning, William Paterson College, Wayne, NJ; Cathryn Dooly-Manning, Saint Joseph's Hospital and Medical Center, Paterson, NJ.

The purpose of this study was to determine the relationship between selected anthropometric variables and of numerous anaerobic power tests with measures obtained on an isokinetic dynamometer. A second purpose was to identify one best test which can be used to measure anaerobic power just as VO2 max is used to measure aerobic power. Thirty-one active college aged males participated in the study. The various anthropometric measures obtained were: circumference measures of the upper and lower legs, height, weight, and percent fat and lean body weight by the hydrostatic weighing method. The anaerobic power tests utilized included: the vertical jump (VJ)(using the Lewis formula), the Margaria-Kalamen stair climb test, the Wingate anaerobic bike test, the 40 yd. dash, and the standing long jump (SLJ). The isokinetic measures were obtained on the knee extensors and plantar flexors of the dominant leg using speeds of 180 deg/sec and 240 deg/sec. All units were converted into power units (Watts) except the 40 yd. dash and the SLJ. A SAS Computer Program was used to obtain the correlations and perform the factor analysis. Correlations which were significant at the .001 level were used in factor analysis. Following principal factor analysis, the rotation method of varimax was utilized to obtain the rotated factor pattern. Five distinct factors were identified suggesting there are five underlying constructs which account for the independent factors. The first factor loaded on lower extremity explosive isokinetic angular power tests independent of body weight which accounted for 27.24% of the variance. The second factor loaded on body size plus explosive isokinetic power movements as well as the VJ. This factor accounted for 25.16% of the variance. The third factor loaded on lower extremity body size and explosive tests which involve lifting the body vertically and accounted for 18.67% of the variance. The fourth factor loaded on the Wingate bike test and accounted for 15.04% of the variance. The final factor loaded on tests involving explosive horizontal movements and accounted for 13.89% of the variance. These findings suggest that there is no one single anaerobic power test which can be used to measure anaerobic power as compared to VO2 max which is used to measure aerobic power. Factor analysis, when applied to numerous field and laboratory anaerobic power tests, show that unrelated aspects exist among these tests and that they are not measuring similar qualities.

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Thursday, April 16
9:00-10:15 a.m.

EFFECTS OF SIX WEEKS OF SUPER CIRCUIT WEIGHT TRAINING ON TESTS OF ANAEROBIC POWER & CAPACITY. Peter J. Maud, Columbus College

The purpose of this study was to evaluate the effects of a six week super circuit weight training program on performance measures of anaerobic power (AnP) and anaerobic capacity (AnCap). The basic circuit consisted of nine exercises (dips, leg extension, overhead press, arm curls, lat pull down, leg press, bench press, inclined sit-ups and seated rowing) performed on a Universal Gym Centurion weight machine. Number of reps for sit-ups and dips was set at 70% max. Weight lifted at the other 7 stations was 70% 1 RM with 15 reps for leg and 8 reps for other lifts. A specific time interval of 80 s was allocated per station with ss encouraged to complete each exercise as rapidly as possible and then bench step on benches 13 to 18 ins in height until conclusion of each time period. They then proceeded immediately to the next station and commenced work. The circuit was completed 3 times per session, 3 days per week. In order to document exercise intensity, a self administered, manually palpated, radial pulse rate check of 15 s duration was performed once per circuit during one of the last 3 exercise stations. As the timing of this check was not predisclosed to ss this tended to eliminate the possibility of increased intensity to artifically elevate HR response. Mean HR response to 3 circuits was 164, 170, and 174 bpm being 83%, 85% and 87% respectively of estimated mean max HR. Subjects in the study were 12 male and 2 female college students. Pre and post training tests were administered to determine AnP from the Lewis equation (Fox and Mathews Interval Training. W.B. Saunders, 1974) utilizing vertical jump height and body weight and AnCap from a 30 s maximum effort, bicycle ergometer test (Bar-Or et al, Int J Sports Med. 1:83, 1980). In all cases ss increased number of sit-ups and dips and 1 RM for all weight lifting exercises. There was a signigicant ($p < .05$) 8% increase in AnCap as measured by the work completed during the 30 s test. No significant changes were found in AnP as tested for by the Lewis equation. It was concluded that super circuit weight training was effective in increasing AnCap. It was not, however, effective in increasing AnP as determined by the Lewis equation, despite a significant increase in leg strength.

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Thursday, April 16
9:00-10:15 a.m.

10 KM PERFORMANCE AND VELOCITY AT $\dot{V}O_2$ MAX IN A HOMOGENEOUS GROUP OF WELL-TRAINED MALE RUNNERS. Don W. Morgan, Fred D. Baldini, Philip E. Martin, and Wendy M. Kohrt, Exercise and Sport Research Institute, Arizona State University, Tempe, AZ 85257.

The interplay between maximal aerobic power ($\dot{V}O_2$ max) and running economy (RE) can be expressed by calculating the running velocity associated with $\dot{V}O_2$ max (v$\dot{V}O_2$ max). Previous research (Study 1) has shown that a significant relationship ($p \leq .01$) exists between 10 km run time (RT) and v$\dot{V}O_2$ max in a heterogeneous group of well-trained males ($\bar{X}$ $\dot{V}O_2$ max=66.2 ± 5.3 $ml \cdot kg^{-1} \cdot min^{-1}$; $\bar{X}$ 10 km RT=31.74 ± 1.99 min). Since competitive runners often exhibit similar fitness levels and performance times, the purpose of this study was to determine the relationship between 10 km RT and v$\dot{V}O_2$ max in a group of male runners displaying a more homogeneous profile on $\dot{V}O_2$ max ($\bar{X}$=64.8 ± 2.1 $ml \cdot kg^{-1} \cdot min^{-1}$) and 10 km RT ($\bar{X}$=32.29 ± 1.27 min) (Study 2). Running economy (RE), v$\dot{V}O_2$ max, and velocity at 4 mM blood lactate (V at 4 mM BL) were calculated in both investigations. The following correlations were obtained from the two studies:

Comparison	Study 1 (n=13)	Study 2 (n=10)
10 km RT vs $\dot{V}O_2$ max	r=-.55 *	r=-.45
10 km RT vs RE	r= .30	r= .64 *
10 km RT vs v$\dot{V}O_2$ max	r=-.78 **	r=-.87 **
10 km RT vs V at 4 mM BL	r=-.85 **	r=-.82 **

* $p \leq .05$; ** $p \leq .01$

The association between $\dot{V}O_2$ max and 10 km RT was more pronounced in Study 1, while RE explained a greater amount of performance variation in Study 2. In both studies, variation in 10 km RT attributable to v$\dot{V}O_2$ max was similar and exceeded that due to either $\dot{V}O_2$ max or RE. v$\dot{V}O_2$ max also accounted for the same variation in 10 km RT as did V at 4 mM BL. It was concluded that among well-trained subjects homogeneous on $\dot{V}O_2$ max and 10 km RT, a strong relationship exists between 10 km RT and v$\dot{V}O_2$ max that is mediated to a large extent by RE. Results of this study also suggest that v$\dot{V}O_2$ max may be potentially useful both as an index of training status and as a sensitive, non-invasive predictor of distance-running performance.

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Thursday, April 16
9:00-10:15 a.m.

CARDIAC OUTPUT, METABOLIC AND VENTILATORY RESPONSES DURING FORMALIZED T'AI CHI CH'UAN. W. Gregory Mucci, Dale D. Brown, Ronald G. Knowlton and Ronald K. Hetzler; Southern Illinois University, Carbondale

T'AI CHI CH'UAN is a martial art that integrates controlled rhythmical movements with a mental state of relaxation achieved through concentration. Although universally practiced, little is known of the physiological responses associated with the execution of this sport by skilled practitioners. The purpose of this study was to determine steady state cardiovascular and metabolic responses during the long form of Yang's style T'AI CHI CH'UAN as well as selected ventilatory dynamics during twenty-five minutes of this exercise and to compare these responses to cycle ergometry at a comparable oxygen consumption. Six skilled males who had studied this exercise for at least two years served as subjects. Mean values (SD) were; oxygen consumption 1.07 (0.41) l/min, R 0.87(0.06), heart rate by telemeter 114(14) bpm, ventilatory volume 24.9(9.6) l/min, blood pressure 142/90.7 (8.8/8.1) mm Hg, cardiac output by CO_2 rebreathing 11.0 (2.7) l/min and lactate by enzymatic assay 24.9 (5.8) mg%. Cardiac outputs were not significantly different during T'AI CHI CH'UAN exercise than for cycle ergometry at the same oxygen consumption nor was the stroke volume (p less than 0.05) but the ventilatory equivalent was significantly lower as was the ventilatory rate. It was concluded that the relaxation discipline associated with T'AI CHI CH'UAN influences ventilatory responses during this activity but has little influence on cardiovascular responses.

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Thursday, April 16
9:00-10:15 a.m.

ANABOLIC STEROID USE IN POWERLIFTING - A CASE STUDY.

John S. O'Connor, Fred D. Baldini, Craig Phelps, and James S. Skinner. Exercise and Sport Research Institute, Arizona State University, Tempe, AZ 85287

While the use of anabolic steroids (AS) has become quite common among weightlifters, the benefits and side effects of these drugs remain controversial. The purpose of this study was to follow selected physiological and hematological variables of a 20 yr-old national caliber powerlifter through a cycle of AS use leading to a major competition. The drug cycle was 12 wks, including a 3 wk taper-off following competition. Mean consumption was 470mg per wk of several types of AS during the first 9 wks. Data were collected at the 3rd wk, 8th wk (peak dosage one wk before competition) and 12 wks after AS use.

PHYSIOLOGICAL DATA

	WT (LBS)	%FAT	LBM (LBS)	FATWT (LBS)	ANP (WATTS)	Max$\dot{V}O_2$ (ml/kg.min)
3 wks	243.3	14.5	208	35.3	1172	36.69
8 wks	242.5	11.0	216	26.8	1355	34.72
12 wks post	225.0	8.3	206	19.0	1165	41.18

HEMATOLOGICAL DATA

	TEST ng/dl	PHOS mg/dl	SGOT U/L	SGPT U/L	LDH U/L	CHOL mg/dl	TRIG mg/dl	HDL mg/dl	LDL mg/dl	$\frac{\text{CHOL}}{\text{HDL}}$
3 wks	597	3.7	89*	74*	262*	234	436*	40	-	5.8
8 wks	2000*	4.7*	51*	58*	228*	270	530*	5*	199*	54*
12wks post	456	3.5	30	80*	191	208	149	28*	150	7.4

(* indicates out of expected range)

There was a seven pound gain (3%) in lean body mass (LBM) between wks 3 and 8. During the same period, peak 5-sec anaerobic power (ANP) on the Wingate test increased 16%. 12 wks after AS use, there was a substantial loss in weight, %FAT, LBM, and ANP. The data support previous reports of elevated liver enzymes during AS use. The variability of enzyme values and testosterone (TEST) reflects the combinations of AS used at various times within the cycle. Lipoprotein fractions were also elevated, with the CHOL/HDL ratio increased to 54; this is at least 5 times normal CHD risk. HDL and SGPT failed to return to expected levels 12 wks after AS use. These data point to the need for additional research on the effects of AS, e.q., changes in LBM, FATWT, and total body water, as well as the relation between specific types of AS and lipoprotein and enzyme changes.

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Thursday, April 16
9:00-10:15 a.m.

THE EFFECTS OF SHORT-TERM FASTING ON FAT UTILIZATION DURING JOGGING. Dianne M. Smith, Eastern Illinois University.

The purpose of this investigation was to examine the effects of short-term fasting on fat utilization during jogging. Specifically, this study examined the effects of a 12 hour fast as compared to a 3 hour fast on fat utilization. Six males (M age=31 yrs.; M weight=76.9 kg; M bodyfat=15.3 percent; M max VO_2 =57.3 ml/kg/min) and six females (M age=30 yrs; M weight=58.6 kg; M body fat=21.4 percent; M max VO_2 = 52.4 ml/kg/min) participated in this study. Each subject completed a maximum oxygen consumption test and two 30 minute runs at approximately 60 percent of their maximal aerobic capacity (max VO_2, ml/kg/min). The two submaximal runs were completed at the same time of the day seven days apart. During the fasted runs, at five minute intervals beginning with minute five, two minute respiratory gas analyses were performed. Information was collected and computed by an integrated Apple IIe microcomputer system. Mean and standard deviation values for oxygen consumption (VO_2, L/min and ml/kg/min), percent max VO_2, pulmonary ventilation (V_E, L/min), rating of perceived exertion (RPE), heart rate (BPM), caloric expenditure (Kcals/30 min) and respiratory exchange ratio (R) were determined for each subject. These values were based on the measures recorded during the second minute of each gas sampling period. A two-way ANOVA with repeated measures ($p < .01$) was used to determine whether differences in fat utilization existed between sexes and fasted runs. Fat utilization was significantly enhanced by fasting 12 hours, as compared to 3 hours, prior to a submaximal run, but there was no significant difference in fat utilization between males and females. Mean values for rating of perceived exertion (RPE), percent max VO_2, pulmonary ventilation (V_E), oxygen consumption (VO_2) and respiratory exchange ratio (R) remained relatively consistent for the fasted runs. Mean heart rate was the only variable that did not attain a steady-state level for the fasted runs.

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Thursday, April 16
9:00-10:15 a.m.

A COMPARISON OF PLASA LIPIDS AND SELECTED FITNESS VARIABLES BETWEEN BLACK AND CAUCASIAN WOMEN, AGES 25-55.

Edwyna P. Testerman, Paula S. Williams, Wendel H. Gatch, The University of Southwestern Louisiana; Dennis F. Tallani, Our Lady of Lourdes Hospital, Lafayette, Louisiana.

The purpose of this study was to evaluate lipid and lipoproteins and fitness variations between black (n=14) and caucasian women (n=14), ages 25-55 following 12 weeks of aerobic training. Levels of high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, triglyceride, total cholesterol and glucose of 28 women were measured before and after a 12-week program of walking and/or jogging. Pretests and posttests included predicted maximal oxygen consumption ($\dot{V}O_2$ max), sum of triceps, suprailium and anterior thigh skinfolds, resting and recovery heart rate and blood pressure measures. Data were analyzed using a t test for program effectiveness over all groups. ANOVA was used on difference between pre and post to see if there was an age and/or race effect and any interaction. There were significant lowering of LDL, total cholesterol, and glucose for both races, but there were no significant changes in HDL and triglyceride. There was a significant increase in $\dot{V}O_2$ max, along with decreases in body weight and sum of three skinfolds in both races. There were no differences within or between the races in resting heart rate, resting blood pressure or recovery heart rate. However, there was a significant difference between races in systolic recovery blood pressure. Black women's systolic recovery blood pressure was significantly lower after the exercise program; it had been significantly higher than the caucasian women's prior to training. Responses to the walking and/or jogging program were similar in both races. Apparently the short-term exercise program was sufficient to improve LDL and alter some blood lipid levels and increase physical fitness, but not HDL.

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Thursday, April 16
9:00-10:15 a.m.

THE DISCRIMINATION OF LEFT VENTRICULAR DYSFUNCTION BY NONINVASIVE MEASURES.

Walter R. Thompson, Laboratory of Applied Physiology, Department of Physical Education, University of Southern Mississippi, Hattiesburg, Mississippi.

Sensitive indicators detecting abnormal left ventricular (LV) function at rest and during exercise are important in the discrimination of normal from post-myocardial infarction (MI) subjects. In this study, 18 subjects had two-dimensional echocardiograms in the apical four-chamber view during upright rest and immediately post-exercise on the bicycle ergometer. Two groups consisted of 11 male late MI patients (Group A) and 7 normal matched volunteers (Group B). Single plane planimetry of cross-sectional area was used for the calculation of LV volumes. The Myocardial Contractility Index (MCI) was calculated as the ratio of systolic blood pressure (SBP) to LV end-systolic volume (ESV). The Myocardial Efficiency Index (MEI) was calculated by dividing the number of $kg \cdot m \cdot min^{-1}$ achieved by the double product; the result was then divided by the body surface area.

	Group A		Group B	
	rest	exercise	rest	exercise
HR ($b \cdot min^{-1}$)	69.20	131.10	71.90	139.60
SBP (mmHg)	139.82	203.45	129.14	202.86
ESV (ml)	48.38	48.36	44.21	42.04
EF (%)	60.86	65.85	64.76	75.92
MCI	3.14	4.48	3.22	5.15
MEI		1.58		1.93

Two-way analysis of variance for repeated measures followed by the Newman-Kuels multiple comparison procedure was used to determine quantitative significance ($p<0.05$) for HR, SBP, ESV, EF, and MCI. For statistical evaluation of MEI, the Student's t test for independent groups was used ($p<0.05$). There were no differences at rest between groups. Exercise values indicated a significant increase in SBP and HR in both groups. EF and MCI increased significantly in Group B only. Significant differences were determined between groups during exercise only for EF, MCI, and MEI. Therefore, the simultaneous determination of peak SBP and ESV for calculation of MCI is a sensitive indicator of abnormal LV function during exercise. In the absence of the determination of ESV, the MEI can be a useful instrument to discriminate post-MI patients from normals.

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Thursday, April 16
9:00-10:15 a.m.

Cardio-dynamic Stability in High vs. Low Compliant Exercising Middle-Aged Men: A 15-year Retrospective Study.

Larry S. Verity and Lynn A. Bartosh, San Diego State University, San Diego, CA.

In recent years, there has been considerable debate on the role of compliance to a prescribed exercise regimen in exercising individuals to facilitate beneficial cardiovascular changes. In order to examine whether or not compliance to an exercise program consisting of 3 sessions/week for 40-60 minutes at 70-90% of maximal capacity was associated with favorable cardiovascular changes, we retrospectively assigned middle-aged men who were initially sedentary to two groups based upon compliance to a conditioning program over a 15 year period. The high compliance group (n=10) consisted of those men (mean age = 46.1 + 8.1 yrs.) who had greater than 70% attendance, while the low compliance group (n=4) consisted of those men (mean age = 49.7 ± 8.3 yrs.) who had less than 50% attendance. From this assignment the purpose of this study was to determine whether there is a difference in selected physiological variables of middle-aged men who are either high or low exercise compliers during a 15 year period. Those variables of interest in this study included VO_2 max (ml/kg/min), HR rest, HR max, SBP rest, DBP rest, and a comparison between the groups over time on these variables was assessed at 0, 7 and 15 years. From the one-way ANOVA, there was a significant difference in VO_2 max (F(1,12)=2.99, $p \leq .05$) between the high (28.3 ± 3.2 ml/kg/min) and low (34.1 ± 3.3 ml/kg/min) compliance groups at 0 years. Also, a significant difference (F(1,12)= 4.74, $p \leq .05$) in HR rest was found between the high (75.0 ± 8.5 bpm) and low (86.0 ± 8.5 bpm) compliance groups at baseline. From the nested factorial (2 X 3) ANOVA, there was a significant group by test interaction (F(2,24), $p \leq .001$) in the change in VO_2 max between the high and low compliance groups over time with the 15 year values being 39.9 ± 5.5 ml/kg/min and 26.2 ± 4.3 ml/kg/min for the groups, respectively. Although no difference in HR max, HR rest, and DBP rest were found between the groups, it was interesting to observe the stability of SBP rest from years 0 to 15 for the high compliers (132.0 ± 16.0 mmHg and 134.0 ± 9.1 mmHg), but not the low compliers (121.0 ± 10.0 mmHg and 146.0 ± 7.9 mmHg). This finding revealed a significant (F(2,24)=3.77, $p \leq .05$) group by test interaction effect on the change in SBP rest. The findings in this study provide further evidence for the potential benefits of regular exercise to facilitate cardiodynamics in middle-aged men and suggest that compliance is a critical factor for cardiovascular benefits to be achieved and maintained.

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Thursday, April 16
9:00-10:15 a.m.

THE RELATIONSHIP BETWEEN MAXIMAL POWER OUTPUT AND MUSCULAR FATIGUE

S. Wilkie and P.S. Freedson, University of Massachusetts, Department of Exercise Science, Boyden Gymnasium, Amherst, MA 01003.

The purpose of this investigation was to evaluate maximal power output and fatigue patterns using a modified Wingate test as the performance criterion. Forty females ($\bar{X}\pm SD$ Age = 20.3 ± 1.85 yrs) performed a modified anaerobic power Wingate test. The protocol included 30 sec of all-out cycling at a resistance corresponding to 75 gm/kg BW (Bout 1). This was followed by a 30 sec self-paced active recovery (0 kg resistance) after which the first 30 sec of all out exercise was repeated (Bout 2). Cumulative power ($kgm \cdot min^{-1}$) (CPR1), peak 5 sec power ($kgm \cdot 5\ sec^{-1}$) (P51) for Bout 1 were determined. Absolute and percent relative fatigue were calculated using Bout 1 and Bout 2 differences. Test retest reliability coefficients exceeded R=.709 (P<.05) for CPR1 and P51. The correlations between P51 and absolute peak 5 sec fatigue and P51 and absolute cumulative fatigue (cum ftg) were R=.624 and R=.562, respectively (P<.05). The subjects were then divided into high (N=22) and low (N=18) power groups (HP and LP) based on P51 values (308 vs 219 $kgm \cdot 5\ sec^{-1}$, P<.05). The HP group had a 54% greater absolute 5 sec fatigue than LP (P<.05). In addition, cum ftg was 39% greater for the HP group (P<.05) ($\bar{X}$ cum ftg = 854 $kgm \cdot min^{-1}$ for HP; 519 $kgm \cdot min^{-1}$ for LP). In relative terms, peak 5 sec fatigue was 31.6% and 20.2% for HP and LP (P<.05) and cum ftg was 29.7% and 23.3% for HP and LP (P<.05). The results of this study indicate that high anaerobic power is associated with a greater rate of fatigue as determined by a modified Wingate test. These findings may have implications for the training of athletes in sports that require repeated maximal anaerobic efforts.

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Thursday, April 16
9:00-10:15 a.m.

WINNING OR LOSING ATTITUDE: CAUSAL ATTRIBUTIONS AMONG LETTERMEN IN HIGH SCHOOL FOOTBALL PROGRAMS WITH A FIVE YEAR HISTORY OF SUCCESS OR FAILURE.

Dean F. Anderson and Steven E. Scullen, Iowa State University.

This investigation examined if winning or losing in high school football was associated with different attitudes toward team performance. A questionnaire was given to 304 varsity football lettermen from 16 central Iowa high schools. The teams had won or lost 65% of the varsity games played in each of the past five years. In the questionnaire, athletes expressed their perceptions of the relative importance of 17 items for team success in general, for the amount of each item they personally contributed, and the amount of each contributed by fellow lettermen. Subjects responded to items using a 7-point scale anchored at the extremes by "very little" and "very much." Factor analysis utilizing principal components with a varimax rotation from each context extracted three consistent and logical groupings which accounted for 70% to 75% of the variance. MANOVA results using factors scores as well as some individual item scores in each of the three contests indicated significant success group effects. Univariate results in the general importance contest revealed differences on the support factor, F= 11.78, p= .0007, and officiating item, F= 4.07, p= .04, with winners rating both more important than losers. Self-quantity attributions were significantly different on the effort factor, F= 10.02, p= .002, and luck item, F= 12.60, p= .001. Winners indicated more personal effort and more luck than losers. In the other lettermen context, winners attributed significantly more effort, F= 109.26, p= .0001; ability, F= 55.49, p= .0001; and external influences F= 27.25, p= .0001; to their teammates' performance than did losers. Results of a 2-way ANOVA with main effects success and context displayed interaction differences for the effort factor, F= 15.33, p= .0001; and luck item F= 6.61, p= .001. Winners indicated that fellow lettermen put forth more effort and had more ability than themselves while losers attributed less effort and ability to their teammates than themselves. The nature of these differences suggests that the social dynamics operating for the two success groups were somewhat different and thus, may require different coaching strategies.

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Thursday, April 16
2:00-3:15 p.m.

THE EFFECT OF AN AEROBIC PHYSICAL ACTIVITY ON SELF-MOTIVATION.

Susan L. Anderson, Sartori Memorial Hospital; Sharon Huddleston, University of Northern Iowa.

A major problem in preventive and rehabilitative programs is the high dropout rate. Increased adherence would have important implications in programs which requires a commitment to behavior change. According to Dishman (1984), an increase in self-motivation would increase the probability that a person would persist at a specific task in the absence of extrinsic reinforcement. Participants in aerobic physical fitness programs have reported positive changes in various state and trait personality variables (anxiety, depression, and self-concept); therefore, it is the purpose of this study to test the hypothesis that participation in an aerobic physical fitness program would result in an increase in self-motivation of college students. An exercise information questionnaire was used to select 105 subjects from students enrolled in activity classes at the University of Northern Iowa. The main criteria for selection was that subjects were not participating in any additional aerobic activities at the time. All activity classes met for 100 min a week for a period of eight weeks. Fifty-two subjects, who participated in aerobic activity classes, were specified as the experimental group while fifty-three subjects, who participated in non-aerobic activity classes, served as the control group. The Self-Motivation Inventory (Dishman & Ickes, 1981) was used to obtain each subject's level of self-motivation both prior to and following eight weeks of participation in the specified classes. An analysis of covariance, using pretest scores as a covariate, indicated a significant ($F(1,102) = 4.84$, $p = .0300$) difference between the aerobic and non-aerobic groups' adjusted posttest scores. This confirms the hypothesis that participation in an aerobic physical fitness program would result in an increase in self-motivation. These results have implications for organizers of behavioral change programs. An increase in self-motivation could mean an increase in the adherence of program participants. The results also support the supposition that selected trait variables are subject to change.

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Thursday, April 16
2:00-3:15 p.m.

ASSESSMENT OF ATTENTION DEMANDS OF CONSTRAINED MOVEMENTS.

Michael McGuire, Mount St. Mary's College: David Bacharach, Syracuse University.

Researchers concerned with measurement of attention demands during movements have concluded that initiation of a movement demands attention as does the termination of movement to a target. The purpose of this study was to assess attention demands following a movement to an unexpected stop. A probe reaction time paradigm was employed using a two-thirds probe frequency. Reaction times (RT) were measured by a vocal response to a buzzer to eliminate potential confounding of structural and capacity interference as expressed by Lee and Elliott (1985). It was hypothesized that if the subject is surprised while initiating or executing the criterion movement (primary task), they will attempt to process more information than necessary about their current position and be unable to react to the probe signal (secondary task) as quickly as a baseline RT. Subjects (N=10) completed three blocks of 48 trials executing a 1m movement on a linear slide in 600±30 msec. Probe RT were taken at 100, 300, and 500 msec after initiation (AI), and 100, 300, and 500 msec after the unexpected stop (AUS). The stop was randomly moved on the slide to prevent any anticipation and/or predictability by the subject. During the noncatch trials the complete 1m movement was executed. A baseline RT was determined having each subject complete 50 simple verbal RT trials prior to the start of the first block of trials. An ANOVA for RT $F(5,42)=3.17$ $p<.05$, was significant. A Duncan's New Multiple Range Test identified the following:

	100 AI	300 AI	500 AI	100 AUS	300 AUS	500 AUS
$\bar{X}$	335	273	246	298	305	292

The increased RT immediately after initiation is in agreement with current notions of attention demands; however, it appears that the stop did cause a demand for attention and we would suspect that the subject was attempting to process the position of the stop which interfered with the probe task.

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Thursday, April 16
2:00-3:15 p.m.

AN ASSESSMENT OF NATIONAL HOCKEY LEAGUE PLAYERS' CAREER TRANSITION NEEDS.

Wayne Blann, Ithaca College, and Leonard Zaichowsky, Boston University.

At an August 1985 National Hockey League Players' Association meeting the Executive Director and player representatives endorsed a survey to assess the career transition needs of NHL players. During the 1986 hockey season a sample of 117 players (about 25%) was tested. A cross sectional sample of players by age, marital status, salary and citizenship was obtained. The Professional Athletes' Career Transition Inventory (PACTI) developed by Blann (1985) was used to collect data on players' career transition needs. A questionnaire was also used to collect demographic data on players: age, marital status, current educational level, academic degree sought, ethnic background, citizenship, salary, parents' occupations, total number years participation in professional hockey, total number years participation in the NHL, number of additional years planned in the NHL. The data was analyzed by calculating percentage responses to the PACTI questions, by calculating means, medians, modes and percentages on the demographic questions and by computing cross correlations among some PACTI questions and some demographic questions. Highlights of the findings: nearly all players are concerned about what will happen when their sport careers end; nearly two-thirds of the players say they are delaying post-sport career planning; nearly three-fourths of the players believe their post-sport careers will be critical to their life satisfaction; only half of the players believe they have adequately managed their finances; more than half of the players plan to further their educations; nearly three-fourths of the players (unrealistically) plan to play another five or more years. Players perceived their greatest need for help in understanding their interests and aptitudes related to career options and in developing and carrying out realistic educational and career plans. The NHL players' association will use these findings to help plan educational and career counseling programs for players.

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Thursday, April 16
2:00-3:15 p.m.

DEVELOPMENTAL CHARACTERISTICS OF EVALUATIVE WORRY IN CHILD AND ADOLESCENT YOUTH SPORT COMPETITORS. Robert J. Brustad, Portland State University.

This study explored potential developmental differences in the specific types of worry experienced by children and adolescents engaged in competitive youth sports. Research (Cook & Stingle, 1974; Horn & Hasbrook, 1986; Veroff, 1969) conducted in various achievement domains has demonstrated that information obtained from peers assumes increasing salience in contributing to evaluations of self during adolescence whereas feedback provided by adults is of diminishing influence. The present study extended previous research by examining whether older children and adolescents demonstrate a concurrent shift in the frequency with which they worry about negative evaluation by peers in the sport context. Two hundred and seven male and female participants in an agency-sponsored youth basketball league completed self-report measures on the frequency of worry about negative evaluation by parents, coaches, and teammates. Contrary to theoretical predictions, t-tests indicated no differences in worry about adult or peer evaluation between younger and older players. It is suggested that evaluative worry in sport may be more reflective of intrapersonal perceptions and sport experience than of developmental level.

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Thursday, April 16
2:00-3:15 p.m.

EXERCISE INDUCED AROUSAL AND PERCEPTUAL-MOTOR PROCESSING.

James H. Cauraugh and Angela Evans, The University of Oklahoma

Recently, much discussion has centered on peak performances during the execution of select motor activity. Many components contribute to the successful attainment of peak performances and one term that is frequently mentioned is arousal level. However, the relationship between exercise induced arousal and perceptual-motor processing has not been empirically established and consistently replicated (Tomporowski & Ellis, 1986). Therefore, the purpose of the present study was to determine the effect of exercise induced arousal on the performance of three perceptual-motor tasks. The tasks were simple and two-choice reaction time (RT) and receptor anticipation. Three levels of arousal, as indicated by heart rate beats per min (BPM), were induced on an electronic bicycle ergometer. Heart rates were monitored by a pulsemeter. The simple and choice RT tasks were controlled by an Apple IIE computer. The light stimuli were positioned directly in front of the subjects and the response switches were attached to the handle bars. For the receptor anticipation task a three section Bassin timer LED wave traveled at 5 mph directly toward the subjects. Fifty trials were administered for each task. Twenty-four subjects were randomly assigned to one of three arousal levels (1) 90 BPM, (2) 120 BPM, and (3) 150 BPM. The perceptual-motor tasks were completed in random order. The RT data were analyzed separately in a 3 x 2 (Arousal Level x Trial Blocks) ANOVA with repeated measures on the last factor. The analysis indicated a significant trial blocks main effect for the two-choice task. Inspection of the means revealed that the first block (*M* = 274 ms, *SD* = 34) was faster than the second block (*M* = 290 ms, *SD* = 41). This finding may be interpreted as an indication that the exercise induced arousal distracted subjects from the task. The anticipation data were analyzed with three error scores. For total error, the Arousal Level (3) x Trial Blocks (10) mixed design ANOVA revealed a significant two-way interaction. Post hoc analyses indicated that for the 90 BPM level total error decreased across the trial blocks. The 150 BPM level increased total error across the blocks and the 120 BPM level remained the same. No significant differences were found for constant and variable errors. The total error results are inconsistent with the arousal performance relationship as predicted by the inverted-U hypothesis (Landers, 1980). Additional research is necessary to further elucidate the relationship between arousal and perceptual-motor processing.

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Thursday, April 16
2:00-3:15 p.m.

RELATIONSHIP OF PHYSICAL FITNESS AND SELF-ESTEEM: A LONGITUDINAL STUDY. Mary E. Engelman and Dale G. Pease. University of Houston.

Studies involving the relationship of physical ability to self-esteem have suggested that perceived physical ability influences self-esteem more than actual physical ability (Sonstroem, 1976; Dishman & Getman, 1981). However, Engeleman and Pease (1985) reported that, with younger children involved in fitness activities, actual fitness had a stronger relationship to self-esteem than perceived fitness. One year later a follow-up study was conducted on the same children to determine if increased emphasis on fitness had increased fitness levels and, therefore, increased self-esteem. The students ($n = 142$) in coeducational classes taught by the same physical education specialist responded to the Washington Self-Description Questionnaire, the Texas Governor's Physical Fitness Test and a general questionnaire developed by the investigators. Results showed that actual fitness scores had improved from 55% of the children being below average the first year to 45% of the children now below average. Global self-esteem and fitness specific self-esteem showed a similar small increase and correlated $r = .76$ as compared to .57 the previous year. Comparisons of perceived fitness and actual fitness to global self-esteem were significant ($P < .01$) and positively correlated with perceived fitness ($r = .34$) having a stronger correlation than actual fitness ($r = .19$). Perceived fitness and actual fitness correlated with specific self-esteem for fitness .39 and .24 respectively. This is a reversal in that actual fitness had a stronger relationship with self-esteem the first year. Of the original sample ($n = 78$) that failed the fitness test the first year, 69% failed the second year. There was little change in the relationship of perceived and actual fitness to self-esteem measures in this group. Although the curriculum the second year had a much stronger fitness component, it apparently did not provide the needed skill mastery that was predicted to cause an increase in self-esteem. Discussion will center on the changing role of actual and perceived fitness on the self-esteem of children.

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Thursday, April 16
2:00-3:15 p.m.

RELATIONSHIPS AMONG TRAIT ANXIETY, GENDER, AND ATHLETICISM.

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Barbara Eisenbarth, Idaho State Department of Education.

This investigation was an attempt to determine some possible consequences of athletic competition; specifically, how sport competition role behavior differentially effects the stress and anxiety levels of females and males.

Role conflict is an element of role behavior which is considered by many to be a negative but common consequence of sport participation for females. The conflict exists because traits attributed to women are not those expected on the playing field, where the valued traits are competence, self-confidence, persistence, and assertiveness--qualities attributed to males.

Women see their athletic role as separate from and inconsistent with their general social self (Kennicke, 1972; Tyler, 1973; Harris, 1977). There are no comparable studies on men, researchers do not know whether men experience role conflict between their social self and their competitive self. We assume that the two roles are essentially congruent (Boutilier, M. A. & SanGiovanni, L., 1983).

Subjects for this study were elementary through college age students ($N = 438$). They were asked to complete a questionnaire regarding demographic information: gender, age, self-perception of athleticism, amount of participation in competitive athletics, and perception of family's athleticism. Also, subjects completed Spielberger's State-Trait Anxiety Inventory (STAI, STAIC). Data analysis included a two way factorial analysis of the interaction between the effects of gender and athleticism on traity anxiety.

Results show that throughout the age span of the subjects (grade four through college seniors), female athletes and male nonathletes have higher levels of trait anxiety than female nonathletes and male athletes ($p < .05$).

The results of this study bring us to a better understanding of the psychological dimensions and consequences of females who compete in athletics and males who do not. The role of female and the role of athlete make different, sometimes conflicting, demands on the individual who fills both roles. Such an individual must deal not only with the force of public opinion that discourages her from serious sport involvement, but with her own self doubts (Boutilier, M. A. & SanGiovanni, L., 1983). It is our hypothesis that this conflict is a stressor which elicits the anxiety reaction.

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Thursday, April 16
2:00-3:15 p.m.

A PSYCHOSOCIAL ANALYSIS OF HIGH SCHOOL CHEERLEADERS. Jerry Freischlag and Paula Williams, University of Southwestern Louisiana.

This study examined selected personality and social factors among high school female cheerleaders. Although cheerleaders are common to most school sports programs the potential contribution to participant self efficacy and adolescent role relationships has not been examined by researchers. Models relevant to female sport participation formulated by Matheney (1965), Loy (1968), and Snyder and Spreitzer (1979) were used in the conceptualization and design of this study. An instrument was developed to assess social factors, body image, and personality. The latter constructs were measured by the Secord and Jourard and Bachman scales, respectively. Data were gathered from a total of 319 cheerleaders, a matched sample of high school females, and high school male athletes among four geographic regions over a two year period. Chi square analyses indicated significant differences between cheerleaders and controls in socio-economic status and academic performance. Cheerleaders were found to come from smaller sized families and to experience early training in dance, gymnastics, and cheerleading. Factor analysis of attitudes toward the body suggest a general self-deprecatory attitude among cheerleaders when compared with control subjects. However, when describing their personality characteristics cheerleaders were more athletic, competitive, and in good spirits than controls. Male athletes assign more positive personality and body image ratings to cheerleaders than those cheerleaders assign themselves. Although the findings concerning body image and personality appear to present some contradictions they can be interpreted by social learning theory.

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Thursday, April 16
2:00-3:15 p.m.

COMPETITIVE TRAIT ANXIETY FOR MALE AND FEMALE VARSITY ATHLETES AND NON-ATHLETES.

Christopher J. Hallinan, The University of Toledo

The purpose of this study was to ascertain the degree of similarity for competitive trait anxiety for selected male and female intercollegiate athletes and selected male and female college students. This study attempted to determine whether scores for Marten's Sport Competition Anxiety Test (SCAT) differed among the selected groups as well as whether differences existed between each group and the SCAT norms. The SCAT provides a set of norms which for college students has significantly different mean scores for males and females ($t = 6.258$, $p < .001$). Studies have found that often athletes have different psychological measures than non-athletes. The extent to which these differences are found using the SCAT remains undetermined. Voluntary responses using the SCAT were elicited from 242 students comprising of 42 male and 69 female varsity athletes and 60 male and 71 female college students. A series of t-tests were used to treat each comparison of the data. For male and female non-athletes a significant result was found ($t = 2.102$, $p < 0.05$). This supports the difference found in the SCAT norms for males and females. Significant results were also found for female athletes vs. female non-athletes ($t = 2.397$, $p < 0.05$) female athletes vs. female college norm ($t = 3.615$, $p < 0.005$). All other comparisons were found to be non-significant including the female athletes vs. male athletes. From these results it is clear that the female athletes have scored atypically from the female population. Furthermore, the female athlete scores are more typical of the scores for groups from the male population. The data presented in this study suggest that female athletes may have more in common with males for attributes measured by the SCAT than other females.

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Thursday, April 16
2:00-3:15 p.m.

THE "NEW" FEMALE ATHLETE: MODERN HERO OR SOCIAL PARIAH? Mary Jo Kane, Bowling Green State University.

The purpose of this study was to examine the influence of sex-appropriate and sex-inappropriate female sport participation on assessments of physical attractiveness. Research has shown a positive relationship between attributions of attractiveness and conformity to sex-role stereotypes; the more one conforms to traditional sex-role norms, the higher the physical attractiveness rating. Because sport has been historically defined as gender-restricted, it was argued that female sport involvement challenged traditional sex-role norms. Therefore, since female sport participation has been regarded as unfeminine, female athletes would be perceived as less physically attractive than their nonathletic counterparts. Additionally, females in more "feminine" (sex-appropriate) sports such as tennis would be seen as more attractive than females in more "masculine" (sex-inappropriate) sports such as rugby because the requirements of sex-appropriate sports do not demand that women challenge "ladylike" behaviors. It was therefore predicted that (a) female athletes would be rated as less attractive than female nonathletes and (b) within sports, females in sex-appropriate activities would be perceived as more physically attractive than females in sex-inappropriate activities. High school subjects were asked to rate the physical attractiveness of photographs of females associated with sex-appropriate and sex-inappropriate activities. A 2 (sex of subject) x 2 (sex of photograph) x 2 (level of sport involvement) x 2 (conformity) factorial design was employed. The data were analyzed through a repeated-measures univariate analysis of variance (ANOVA) using physical attractiveness ratings as the dependent variable. Results indicated that contrary to the first prediction, female athletes were seen as more attractive than nonathletes, but only within sex-appropriate activities. Results also confirmed the second hypothesis; females in sex-appropriate sports were rated as significantly more physically attractive than females in sex-inappropriate sports. This result emerged even though the same picture of the same female was being rated. These findings strongly challenge both research and "popular press" beliefs that as a result of the women's movement in general and Title IX in particular, social stigmas previously associated with female sport involvement have diminished. Clearly, conformity to "appropriate" sex-role norms still heavily influence social perceptions and assessments of the modern female athlete. One key question then becomes: How fundamental are the changes regarding the role of the "new" female athlete?

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Thursday, April 16
2:00-3:15 p.m.

THE EFFECT OF SEX, GENDER ROLE, AND WEIGHT TRAINING ON SELF-CONCEPT AND BODY CATHEXIS.

Patricia L. Lauffer and Jean M. Williams, University of Arizona.

Tucker found significant increases in self-concept and body cathexis of college-aged males engaged in weight training courses, but the relationship of strength to self-concept and body cathexis of college-aged females is unknown. The purpose of this study was to examine the self-concepts and body cathexis of both males and females engaged in weight training and also to examine if differences in gender role would influence the relationship of strength to self-concept and body cathexis. It was hypothesized that (1) only the weight training group would significantly increase in strength, self-concept, and body cathexis from pre- to post measurement and there would be no sex differences but for males being stronger; (2) no difference would be found in weight training groups pre to post between the masculine and androgynous typed males and the masculine and androgynous typed females with respect to self-concept and body cathexis, but the changes for masculine females would be greater than those for feminine females; and (3) there would be a linear relationship between strength and self-concept and body cathexis. The subjects were 34 males and 47 females enrolled in weight training classes and 26 control subjects enrolled in introductory psychology classes. A group by sex ANCOVA was utilized to examine hypthesis one. A gender role (masculine vs. androgynous) by sex ANCOVA and gender role (masculine females vs. feminine females) ANCOVA were utilized to examine the second hypothesis. Multiple regression analyses examined the relationship of strength and self-concept and body cathexiss. Only the weight trainers significantly increased in strength and males were stronger than females; however, there were no significant changes in self-concept or body cathexis. The first part of hypothesis two was accepted and the second part was rejected, but it is difficult to interpret these findings because there were no overall changes in self-concept and body cathexis. A linear relationship was found between strength and body cathexis, but not between strength and self-concept. The results are discussed in terms of the failure to replicate Tucker's data. One of the potential explanations was the difference in weight training routines, i.e., Tucker's group total body workouts versus the present study's self designed and paced individual programs. Another possibility was Tucker's males increased in strength a greater percentage than the present male subjects, but the females in the present study exhibited similar strength increases as Tucker's males yet they did not change in self-concept and body cathexis. Future research needs are also identified and discussed.

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Thursday, April 16
2:00-3:15 p.m.

TEACHER BURNOUT: A COMPARISON OF K-12 PUBLIC SCHOOL PHYSICAL EDUCATORS IN SUBURBAN COOK COUNTY, ILLINOIS.

Joan E. Martin, Naperville Central High School, Naperville, Illinois.

The purpose of the study was to compare the amount of perceived burnout among elementary, junior high, and secondary public school physical education teachers. Second, consideration was given to the relationship between teacher burnout and six selected demographic variables (sex, age, marital status, family status, years of experience and extracurricular duties). The subjects were 463 randomly selected elementary, junior high and secondary physical education teachers in suburban Cook County, Illinois. The instruments used to collect the data were the Maslach Burnout Inventory (MBI), a 22-item questionnaire consisting of three subscales: Emotional Exhaustion, Depersonalization, and Personal Accomplishment, each subscale having two dimensions: frequency and intensity, and a personal information sheet. Analysis of variance (ANOVA) was used to identify significant differences between the three teaching groups, the demographic variables and burnout. If F's were determined to be significant, the group means were subjected to the Duncan New Multiple Range Test. The .05 level of significance was used for all research questions. Data revealed that physical education teachers, regardless of their teaching level, expressed Emotional Exhaustion more often and with more intensity than Depersonalization. Results showed that, on all three subscales, secondary teachers expressed burnout more often and with more intensity than junior high or elementary teachers. Findings indicated that significant differences in the frequency and intensity of Emotional Exhaustion, Depersonalization and Personal Accomplishment were established with five (age, marital status, family status, years of experience and department chairman) of the six demographic variables. No significant differences were established with two (sex and coaching/club-class sponsor) of the six demographic variables.

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Thursday, April 16
2:00-3:15 p.m.

RELATIONSHIP OF COGNITIVE ANXIETY, SOMATIC ANXIETY, AND SELF-CONFIDENCE TO PERFORMANCE IN MALE AND FEMALE TRACK AND FIELD ATHLETES.

Vikki Krane and Jean M. Williams, University of Arizona.

Currently many sport psychologists are focusing the study of anxiety and performance within a multidimensional theory that differentiates anxiety into physical and mental components. The physical, or somatic, component of anxiety includes bodily symptoms of anxiety while the mental, or cognitive, component of anxiety is characterized by negative concerns and an inability to concentrate. Responding to the need for a sport specific measure of cognitive and somatic anxiety, Martens and his colleagues (1983) developed the Competitive State Anxiety Inventory-2 (CSAI-2) which measures self-confidence as well as cognitive anxiety and somatic anxiety. Initial research with the CSAI-2 suggests the subcomponents may differentially relate to other variables, including performance, sex, skill level, and nature of the sport. The present study was designed to examine the relationship among cognitive anxiety, somatic anxiety, confidence and athletic performance in male athletes compared to female athletes. The participants were 38 male and 33 female collegiate track and field athletes competing at an invitational track meet that required stiff qualifying times in order to participate. The CSAI-2 was completed 10-20 minutes prior to the event in which each athlete competed. Since researchers have suggested a performance measure derived as a deviation between previous performance and current performance is a more powerful measure of performance as predicted by psychological variables, the present study operationally defined performance as both a comparison of current performance to previous personal best time or distance and placement in the event. Results of multiple regression analyses showed confidence to be the best predictor of female performance and cognitive anxiety the most predictive of male performance. Since all CSAI-2 subcomponents accounted for only 2-13% of performance variance, regardless of the measure of performance, age and years of competitive track and field experience were added to the analyses. Years of experience and confidence were most predictive of female athletic performance, accounting for 40% of the performance variance. The best predictor of male athletic performance was age followed by cognitive anxiety, accounting for 30% of the performance variance. Overall, the female athletes had higher cognitive and somatic anxiety and lower self-confidence than the male athletes. An analysis of the CSAI-2 subcomponents by placement and sex revealed slightly different subcomponent patterns for male and female "placers" and "nonplacers." The results are discussed in terms of the multidimensional theory of anxiety and the potential merits of the CSAI-2 in facilitating an understanding of the anxiety/performance relationship.

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Thursday, April 16
2:00-3:15 p.m.

COMPARISON OF IMAGERY INDUCED AROUSAL EFFECTS ON PERFORMANCE OF A VISUALLY DISTORTED, NOVEL BALL TOSSING TASK IN FEMALE COLLEGE ATHLETES OF HIGH AND LOW IMAGING ABILITIES.

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The purpose of this research was to test the hypothesis that female collegiate athlete subjects identified as high visual and kinesthetic imagers by the Movement Imagery Questionnaire (MIQ) (Hall, 1985) would perform differentially from low imagery subjects on a novel ball tossing task under a displaced vision condition. Heightened arousal due to stronger abilities in visualizing the difficult aspects of the task were expected to account for an inhibitory performance effect. Of 75 female athletes (entire available population of varsity female athletes at a large Division I, southern university) tested with the MIQ, four very high and four very low imagers were identified. Baseline data were collected for the eight subjects on the following procedures designed to assess level of arousal; Spielberger State-Trait Anxiety Inventory (STAI), heart rate (HR), galvanic skin response (GSR), and electromyographic (EMG) (frontalis muscle). Following collection of baseline values, subjects were provided a description of a novel task (50 tennis balls to be tossed into a target basket from a distance of 10 feet) and also shown vision distorting goggles to be worn during the ball tossing task. A metronome that would dictate the rhythm for the ball toss was also described. Subjects were encouraged to put on the goggles in order to become familiar with the visual distorting effect. Then subjects were told to imagine that they were executing the required task under the visually distorted condition. HR, GSR, and EMG values were again assessed at this point. Subjects then proceeded to perform the 50 trials of ball tossing. At intervals of 10, 30, and 50 trials HR, GSR, and EMG values were again recorded. At the conclusion of the 5th trial, the STAI was again administered. Within subject (repeated measures) and between group comparisons (ANOVA) were conducted in order to identify changes in arousal levels and differences in criterion task performance values. The hypothesis that high imagers would perform differentially from low imagers on the selected measures of arousal as well as the criterion novel task was partially sustained.

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Thursday, April 16
2:00-3:15 p.m.

RELATIONSHIP OF SOCIAL COMPARISON JEALOUSY TO OTHER VARIABLES IN SPORT.

Dale G. Pease and Mary E. Engelman. University of Houston.

Emotions in the sport experience have been traditionally viewed on an activation continuum with little regard for understanding the cognitive state that may have produced the change in activation. Recent evidence also suggest that some cognitive states may not produce strong physiological changes but still may influence performance due to disruption of attention control and other processing mechanisms. Social comparison jealousy (SCJ) would seem to be a variable that would not necessarily invoke strong physiological change but could disrupt the processing of relevant information. SCJ is defined as those situations that challenge one's superiority or equality and includes feelings sometimes described as envy. Since limited research exists on SCJ in sport a theoretical model was developed from the romantic jealousy research (White, 1981) and the general social comparison research (Bers and Rodin, 1984) and tested in a sport setting. One hundred and eighty six boys and girls, ages 11 to 13, enrolled in a youth soccer program responded to a questionnaire that included the Washington Self-Description Questionnaire and Bailer-Cromwell Locus of Control instrument plus investigator developed scales for importance of participation, perceived role of leadership and the SCJ scale. Internal consistancy for the developed scales was .65, .57 and .77 respectively. Multiple regression analysis indicated that participation, leadership, and gender were significant predictors of SCJ, Multiple $R= .37$; $F\ (3, 182) = 9.82$; $p < .001$; $R^2 = .14$. Self-esteem, locus of control and type of team (indication of ability) were not significant predictors. Individual comparisons showed a significant positive correlation between SCJ and participation and a significant negative correlation between SCJ and perceived leadership role. A trend ($p= .07$) in the data suggests that as SCJ increases, self-esteem decreases. Girls reported higher SCJ than boys with few other gender differences observed. Results will be discussed in relation to the theoretical model and the adaptive function SCJ may have in a sport setting.

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Thursday, April 16
2:00-3:15 p.m.

SPORT PARTICIPANTS' ACHIEVEMENT GOAL ORIENTATIONS AND PROJECTED REASONS FOR DISCONTINUING SPORT PARTICIPATION.

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The purpose of this investigation was to determine the multivariate relationship between sport participants' achievement goal orientations and projected reasons for dropping out of sport and to assess the effectiveness of the achievement goal orientations in predicting reasons for dropping out of sport. A study by Pemberton, Petlichkoff and Ewing (1986) has established the reliability and validity of the Achievement Orientation Questionnaire used to assess the achievement goal orientations. Multiple achievement goal orientations have been identified for sport participants, sport drop outs, and nonsport participants (Ewing, 1981; Pemberton, Petlichkoff, & Ewing, 1986). Ewing (1981) found that sport drop outs were more mastery oriented and more competitive ability oriented than were sport participants. Theoretically, the achievement goal orientations are antecedents to the reasons for discontinuing sport participation. To further explore this relationship, 460 athletes attending the University of Illinois Sport Camps participated in this study. Athletes ranged in age from 13 to 18 years. Subjects completed the Achievement Orientation Questionnaire and a series of 14 questions related to reasons for dropping out of sport. Five achievement goal orientation scores were calculated for each subject (i.e., social approval, sport mastery, sport venture, cognitive ability and sport competence). Achievement goal orientations were used as predictor variables and the reasons for dropping out used as criterion variables. Multivariate analysis of variance indicated a significant multivariate relationship existed between the predictor variables and the reasons for dropping out of sport, $F(70,1960) = 1.34$, $p < .05$). Canonical correlation analysis revealed one canonical variate to be significant, accounting for 11% of the variance. Results for the univariate multiple regression analyses are presented for each of the criterion variables. The discussion focuses on the theoretical implications for multiple achievement goal orientations and their use in predicting sport behavior.

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THE INFLUENCE OF CAUSAL DIMENSION ORIENTATIONS AND SELF-CONCEPT OF ABILITY ON COGNITIVE AND BEHAVIORAL PARAMETERS OF ADULTS EXPERIENCING REPEATED FAILURE. Mary E. Rudisill, University of Houston.

Recent findings suggest that the presentation of causal dimension orientations and high or low self-concept of ability (SCOA) influence children's expectations, persistence, and performance when failure is perceived (Rudisill, 1986). Research suggests that when children are presented internal, controllable, unstable causal dimension orientations, their expectations and persistence increase and performance improves. In addition, the children who have high SCOA also have higher expectations, persistence, and performance scores than those children with low SCOA. This investigation was conducted primarily to compare the influence of an internal, controllable, unstable orientation with that of other orientations and self-concept of ability (SCOA) on adult expectations, persistence, and performance. Male and female college age students (N=90) responded to a SCOA questionnaire. Based on the response to this questionnaire, 40 high, 25 average, and 25 low SCOA subjects participated in this study. Separately, the high, average, low SCOA subjects, each randomly assinged to one of three causal dimension orientation groups, were oriented to perceive their performance on a stabliometer balancing task as due to 1) internal, uncontrollable, stable factors; 2) internal, uncontrollable, stable factors, (IUS); or 3) nothing in particular (NDO). Participants then received fictitious nromative feedback over 15 trials, suggesting they had performed below average compared to other college age students. Dependent variables included: 1) expectancies, 2) persistence with the experimental task, and 3) performance scores. The expectancies dependent measures were significant for the causal dimension groups. The ICU and NDO groups' expectations increased significantly from the first trial block to the last trial block, while the IUS group's expectations decreased significantly from the first trial block (pre-manipulations) to trial blocks 2, 3, and 4 (post-manipulations). Additionally, the ICU and NDO groups had higher expectations than the IUS for trial blocks 2, 3, and 4. Expectations appeared to be the only variable affected by the dimensional orientations. These results are discussed in terms of the benefits of causal dimension orientations and their influence on adult cognitive and behavioral measures.

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Thursday, April 16
2:00-3:15 p.m.

ADHERENCE TO EXERCISE AND SPORT CLASSES BY COLLEGE WOMEN.

Donald Siegel, James Johnson, Caryl Newhof, Smith College.

Despite the plethora of information currently available on the direct and serendipitous effects of participating in exercise and sports programs, voluntary involvement still remains below 50% in most countries. Furthermore, of those who do enter an exercise program, 50% or more can be expected to dropout within the first six months. While investigators have examined the personal and situational variables associated with this adherence phenomenon in adults involved in "health oriented" exercise programs, little attention has been focused on the college aged population. Furthermore, no studies have examined women as a population in such a context. Consequently, the purpose of the present investigation was to determine differences in program perceptions between women college aged students who completed (N=135) or dropped out (N=51) of a variety of non-credit, nonrequired classes. Questionnaires, containing 20 items found to be relevant to the adherence problem, and having acceptable reliability ($r > .75$, test-retest one week), were administered at the beginning and end of a student's class involvement. For initial and final questionnaires data sets were each subjected to principal components factor analysis with varimax rotation. For each solution, factors with eigen values greater than one were retained and factor scores derived. Original variables having factor loadings greater than .50 were then regressed on their respective factor scores to assess the stability of derived factors. Those yielding a multiple R^2 greater than .70 were retained for further analyses. Subsequently, factor scores for the initial and final questionnaires were entered into separate discriminant analyses to assess whether completers and dropouts differed in their pre- and post-factor profiles. These analyses revealed that completers were initally more positive than dropouts about developing and utilizing personal skills, using their minds in physical activity and being involved in social interactions. Dropouts were initially more positive about the anticipated health and fitness concommitants of participation. At the completion of a class or at the point a student dropped out analyses revealed that completers found their participation to be significantly more recreational, more socially rewarding, and more conducive to skill development and utilization. Perceived health and fitness perceptions did not significantly discriminate between groups. These results support and extend a recent study (Wankel, 1985) of an employee fitness program for men which found participatant enjoyment and the quality of experience in the exercise setting to be more highly related to adherence than health and fitness concerns.

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Thursday, April 16
2:00-3:15 p.m.

PERCEPTUAL MOMENT LENGTH AND TRACKING CAPABILITIES UNDER RESTRICTED VIEWING CONDITIONS.

William J. Tharion, US Army Research Institute of Environmental Medicine

The major purpose of this study was to investigate the role the perceptual moment has with respect to tracking skills. A secondary problem was to evaluate the point of performance breakdown in the skills of intercepting and catching of tennis balls under restricted viewing conditions. Eight males and eight females of college age served as subjects. The subjects were tested on three days. On day 1 subjects were administered an apparent motion test, a simple finger reaction time test and intercepting and catching ability under the full light condition. Days 2 and 3 had the same format as day 1 except that the additional light conditions of three-quarters, one-half, and one-quarter light were also presented under the catching and intercepting tasks. The results show reliability coefficients of .93 and .91 for the before and after apparent motion tests. The reliability coefficients for reaction time was recorded at .86. The correlation coefficients for the tracking skills range from values of a low of .10 to the high of .93. An analysis of variance with the use of Scheffe's test reveals that performance drops off significantly when reducing the light from one-half to one-quarter of the ball flight. The perceptual moment length did not correlate significantly with the tracking tasks. Reaction time in contrast to the perceptual moment did correlate with tracking performances, with the strongest correlation being -.76. All light conditions within the catching task proved to be significantly correlated with reaction time. Differences between males and females were found to be significant only on the catching task. The larger differences occur at the less restricted light conditions i.e. full light.

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Thursday, April 16
2:00-3:15 p.m.

FACTORS RELATING TO YOUTH SPORT PARTICIPATION AND EXPRESSED DESIRE TO PARTICIPATE IN PHYSICAL ACTIVITIES AMONG EARLY ADOLSECENTS.

Mary L. Young
University of Minnesota.

This study focuses on the relative influence of various factors which have generally been reported in the literature in isolated clusters. It extends a previous study with adolescents and athletic participation to younger age groups and focuses on intramurals and youth sport program participation outside of school as well as expressed desire to participate in physical activity. Factors included are: physical performance items - sit-up and 600 yd. run; average grade received in school; birth order; number of older siblings; height; and self-perception items - estimation of physical fitness level, ability in sport and physical activity, academic ability; skill in social relationships; perception of parents estimate of athletic ability; belief in importance of personally being physically fit, good in sport and physical activity; acceptance of weight, height; self-esteem; and locus of control. In the fall of the year, grade 7 males (74), females (34) and grade 8 males (68), females (51) from a predominately white, suburban middle school were given (1) a background information form and questionnaire which included demographic data, questions pertaining to self-perception items and desire to participate in physical activities; (2) Rosenberg Self-Esteem Scale; (3) Nowicki-Strickland Locus of Control Scale; and (4) the physical performance items. Stepwise multiple linear regression results for expressed desire to participate in physical activities (F-to-enter values given after each predictor variable) for grade 7 males included: estimate of academic ability (11.95), importance of personally being good at sports (6.49), estimate of fitness level (5.23), birth order (4.06) and accounted for 31% of the variance. For grade 8 males, average school grade (28.55), importance of personally being good at sports (15.80), number of older brothers (8.17), older sisters (4.00), and acceptance of weight (3.00) accounted for 54% of the variance. For grade 7 females, sit-ups (81.39) and estimate of ability in sport and physical activity (6.57) accounted for 73% of the variance. These models were all significant at the .0005 level. The model for grade 8 females was not significant. Discriminant analysis for whether or not the individual was currently participating in youth sports programs including regular participation in intramurals allowed a significantly better than chance classification for all groups (for grade 7 females, a correct classification of 91% with 7 items; for grade 8 females, 67% with 4 items; for grade 7 males, 80% with 3 items; and for grade 8 males, 82% with 8 items). Estimate of the importance of personally being good in sport and physical activity was the best predictor variable for the grade 7 and 8 males followed by 600 yd. run for grade 8 males. Estimate of fitness level was the best for grade 7 females followed by estimate of ability in sport and physical activity. For grade 8 females, estimate of ability in sport and physical activity was the primary predictor variable.

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Thursday, April 16
2:00-3:15 p.m.

DETERMINATION OF ANGULAR MOMENTUM DURING TAKE OFF AND EARLY FLIGHT PHASES OF SKI JUMPING.

Kevin R. Campbell, The Cleveland Clinic Foundation; Mark D. Grabiner, The Cleveland Clinic Foundation; Patrick Graham, University of Massachusetts.

It has been stated that the objectives of the take-off phase in ski jumping are; to obtain a maximum vertical velocity, produce a favorable body position, to minimize drag forces on the body during this extension, and to provide an initial angular momentum for the forward rotation of the body over the skis. Several authors have studied various aspects of the ski jump take off, however, to date, there exists little or no literature which examines the angular moment in ski jumping. The purpose of the investigation were threefold: (1) to determine the local and remote angular momentum components of the body segments and the magnitude of their contributions to total angular momentum about the center of gravity (C of G) at take off and in early flight, (2) to determine how these key segmental components change during the transition from take off to early flight, and (3) to quantify the relationship between total angular momentum and its components at take off to the total angular momentum in early flight. Twenty-six elite male subjects competing at the World Cup competition were filmed from a sagital view at 100 frames per second by two cameras. Camera one recorded motion at the last 10 meters of the ramp and the first meter of flight. Camera two was located 20 meters beyond the take-off point. Standard film analysis procedures were employed to obtain two-dimensional coordinate data of the motion of the ski jumper system. This data was subsequently smoothed using a low pass digital filter. The results and appropriate segmental mass and inertial data were used to calculate the remote (H_R) and local (H_L) angular momentum of each segment which were summed to find the angular momentum (H_T) about the C of G. Multiple regression was used to predict H_T as a function of the segmental H_R and H_L components. Fifty-three percent of the variance associated with H_T was accounted for by the H_L of head/neck/trunk (25%) and H_L of the arms (28%). These contributions were reduced at early flight (1.0s e.t.) to 4 and 2 percent, respectively. H_T changed from -15.96 to 2.2 Kgm^2/s and the coefficient of variability changed concommitantly from 749 to 35% respectively. The relationship between the components of H_T at take off and H_T at early flight was not significant (R^2=.42; _df_=10,15; _F_=1.09). Results suggest that the complexity of the dynamics in the transition from take off to early flight preclude explanation of changes in angular momentum with simple linear models.

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Thursday, April 16
3:45-5:30 p.m.

A KINEMATIC ANALYSIS OF THE THREE BASIC BOXING PUNCHES.

J.M. Donivan, and R.W. Stauffer, United States Military Academy;
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With the resurgence of boxing popularity within recent years, safety has been a major issue. The majority of the research, however, has focused on the physiological and biomechanical aspects of head trauma. The research in biomechanics has involved primarily investigations of the force attenuation characteristics of boxing gloves and headgear. Little work has been done on quantifying the force or velocity-producing capabilities of boxers. Furthermore, little is known or recorded as to the factors that provide the greatest influence in generating glove velocity.

The purpose of this study was to determine the effects of body size and glove weight on the displacement, duration, velocity, and acceleration of the gloved fist during the three principal boxing punches: jab, cross, and hook.

The subjects were nine male novice boxers, three from each of the three weight categories of 130 to 135 pounds (lightweight), 152 to 165 pounds (middleweight), and 180 to 192 pounds (heavyweight). Each subject executed each of the three punches while wearing the 8-, 12-, and 16-ounce gloves. All subjects executed the punches in the same sequence: jab, cross, and hook. The subjects directed their punches toward a head-high target on a standard practice bag. High speed kinematic analysis quantified the temporal and kinematic factors of total and absolute displacement, duration, velocity, and acceleration associated with each punch. The data were analyzed by an ANOVA for repeated measures. The Tukey Wholly Significant Difference Test was used for post-hoc testing.

The results for all kinematic variables demonstrated that the type of punch executed was the major determinant of the magnitude of each factor studied. In general, body weight had little influence on the magnitude of the kinematic variables. Glove weight was found to have little influence on these kinematic variables. The jab was significantly quicker than the cross and hook, but the hook yielded the highest velocity of the three punches. Lastly, the results showed the technique employed can significantly affect the resulting velocity of the gloved fist.

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Thursday, April 16
3:45-5:30 p.m.

ACTIVATION LATENCIES OF MULTIPENNATE MUSCLE DURING SUBMAXIMAL ISOTONIC CONTRACTION.

M.D. Grabiner, The Cleveland Clinic Foundation; Vicky Jaque, University of Southern California.

This study was conducted to assess the effects of practice/learning upon the (1) electromechanical delays (EMD) of each head of the triceps brachii, (2) the "true" EMD, (3) "activation lag" periods, and (4) the activation order associated with this multipennate muscle. Recent studies have suggested the need to electromyographically monitor all major agonists/synergists associated with a particular joint system if a more accurate assessment of reaction time, particularly the peripheral component, is desired. Eight subjects participated in the study. Bipolar surface electrodes detected EMG signals (digitized at 1000 Hz) from each of the three heads of the triceps brachii muscle. The motion used in the experiment was elbow extension in a transverse plane. The subjects were seated with the forearm attached to, and supported by, a dynomometer which restricted motion to the desired plane and allowed for the quantification of the system's kinetics. Each subject performed one hundred trials (analyzed in groups of 10 trials) at approximately 70 percent the previously established maximum peak acceleration. Analysis consisted of calculating the EMD of each head of the triceps, "true" EMD (time from the first head's activation to movement), activation lag time (difference between the first and last activated heads EMD), and activation order. Initial statistical analysis indicated no significant departures from the desired 70 percent maximum for the trial groups. Correlations between EMD and peak acceleration for the three heads were found to be low, consistent with previous research, and the relationship was not improved by use of the true EMD. Activation lag times were found to decrease (nonsignificantly) over the 100 trials by five ms. Activation order was found to vary widely between subjects but as a group favored the medial head. Results of this study appear to support the contention that the "product" nature of EMD measure is of less merit than generally considered and that a more "process" related parameter would provide better information regarding peripheral processes.

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Thursday, April 16
3:45-5:30 p.m.

ALTERATIONS IN RUNNING KINEMATICS DURING THE IRONMAN TRIATHLON.

Susan J. Hall, Oregon State University; Mary L. O'Toole, Labman, Inc.; W.B.D. Hiller, Labman, Inc.

Triathletes often complain of the alleged influence of a swim or cycle leg during a competitive triathlon on the kinematics of running immediately thereafter. Fatigue, however, may also exert an influence on running form, particularly when the run is the last leg of a lengthy event. The following study was undertaken to evaluate whether running kinematics are consistently altered immediately after swim and cycle legs of a triathlon, and what effect generalized fatigue may have on running kinematics when the run is the final leg of an ultra-endurance triathlon. Sixteen participants in the 1985 Hawaiian Ironman triathlon, (11 males and 5 females), volunteered as subjects. During the week prior to the event, at the end of a 400m warm-up run at each subject's approximation of race pace, sagittal view 16mm film clips were taken at 100Hz to document non-fatigued running kinematics. During the event itself, sagittal view videotape recordings were taken of subjects running from the water to the cycle storage area following the 3.86km ocean swim. Technical difficulties interfered with an attempt to collect similar videotape data at the cycle-run transition area after the 180.2km cycle leg. In order to document any effects of generalized fatigue, sagittal view 16mm film clips were taken at 100Hz at a point approximately 8km into the final leg of the race, the marathon run. Qualitative comparison of the post-swim videotape and pre-race film records showed kinematic characteristics of the post-swim run including reduced stride length, increased single leg support time, and reduced knee elevation, for all subjects. The race and pre-race film records were digitized, with kinematic variables quantified by standard computerized procedures and comparisons made by related t-tests ($\alpha = 0.05$). Data for male and female subjects displayed the same patterns. Mean running velocity was found to be 3.64 + 0.71m/s during the pre-race films, and 3.32 + 0.49m/s during the actual event. Although subject center of mass velocities and stride lengths were not significantly different in the race and pre-race films, subjects during the race showed significantly greater percentages of stride cycle time spent in single leg support, smaller percentages of stride cycle time spent in swinging the non-support leg, and significantly less vertical deviation of the center of mass.

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Thursday, April 16
3:45-5:30 p.m.

A KINEMATIC ANALYSIS OF THE WHEELCHAIR JAVELIN THROW

Nancy P. Hamilton, Marlene J. Adrian, University of Illinois

Over the past two decades wheelchair sports have been gaining in popularity among disabled populations. At present there is no research concerning the techniques of performance of the various throwing events from the confines of a wheelchair. Most chair athletes rely on techniques derived for the able bodied. It is timely, therefore, to investigate the techniques for throwing that are currently used by elite wheelchair athletes. It is the purpose of this study to develop a kinematic model of the wheelchair javelin throw as performed by elite wheelchair athletes.

Ten elite wheelchair athletes were videotaped during their participation in the 1986 National Wheelchair Athletic Association Championship Meet held in Champaign, Illinois. Videotaping was done using a Xybion Electronic Systems high speed shutter video camera. The videotape was then analyzed using a Mitsubishi Videoprinter. The parameters examined were 1) total arc of trunk excursion in throw direction, 2) total arc to arm excursion in throw direction, 3) angular velocity of arm at release, 4) angle of projection, 5) angle of attack, and 6) relative trunk rotation. The relationship of these parameters to distance travelled by the javelin was then investigated.

The mean release velocity was 1050° per second, with the mean angle of both attack and projection found to be 39°. The longest throw (23.44 meters) was accomplished with a release velocity of 1080° per second, and angle of projection of 38° and an angle of attack of 28°. This angle of projection is comparable to that of elite able bodied throwers.

The better throwers used a trunk excursion of 70° - 90° and an arm excursion of 200° - 250°. Trunk rotation differed between athletes dependent on chair placement. The top thrower set the wheelchair at a 90° angle to the line of flight, allowing him to rotate freely, using the opposing arm to create a force couple, the only thrower to use a classic javelin pose.

Based on the results of this study it can be concluded that the wheelchair athlete can control velocity, angle of projection, and angle of attack. Individual profiles were constructed with respect to performance and formed the basis for a kinematic model.

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Thursday, April 16
3:45-5:30 p.m.

BODY STABILITY DIFFERENCES BETWEEN SKILLED AND LESS-SKILLED ARCHERS. Philip E. Martin and Michael Mungiole, Exercise and Sport Research Institute, Arizona State University.

Because of archery's static nature, one can speculate that archery performance would be enhanced if body sway is minimized just prior to arrow release. Unfortunately, there is little empirical evidence that defines the relationship between archery performance level and body stability. The purpose of this study was to determine if skilled archers (SA) display a higher degree of stability than those of lesser skill (LSA). Members of the U.S. Archery Team (n=22) and the Junior Olympic Archery Development Program (n=28) served as subjects for the SA and LSA subsamples, respectively. All subjects performed a series of 10 shots while standing on a force platform, which was sampled at a rate of 50 Hz over a 5 second period in order to quantify center of pressure (CP) migrations. Focusing on the one second period immediately preceding release, CP data was used to quantify a series of variables describing migration parallel and perpendicular to the target. These included total migration (TM), range (R), and variability (V) about the mean CP position. Results are summarized in the following table:

Variable	SA ($\bar{X}$±SD)	LSA ($\bar{X}$±SD)	F	p
Parallel TM (mm)	9.70±4.31	11.70±3.12	3.61	.063
Parallel R (mm)	4.25±1.20	5.63±1.79	9.67	.003
Parallel V (mm)	1.19±0.40	1.60±0.55	8.87	.005
Perpend. TM (mm)	9.60±2.59	12.54±4.79	6.71	.013
Perpend. R (mm)	3.80±1.17	5.53±3.32	5.41	.024
Perpend. V (mm)	0.90±0.24	1.27±0.63	7.06	.011

These results demonstrated that the SA group displayed significantly lower amounts of CP migration in directions both parallel and perpendicular to the target than the LSA group. From these results, it was concluded that the SA displayed a higher degree of body stability than the LSA. The differences in CP migration between groups, however, were not exceptionally large. This, coupled with the relatively large variabilities within each group, demonstrated that there was a considerable degree of overlap between the groups. This suggested that total body stability influences, but is not a strong determinant, of the level of performance attained by archers.

Supported by a grant from the U.S. Olympic Committee

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Thursday, April 16
3:45-5:30 p.m.

THE ENERGETICS OF POLE VAULTING. Peter M. McGinnis, University of Oregon.

The transformations of mechanical energy in the pole vault are important determinants of the outcome of this event. The kinetic energy generated by a vaulter during the run up is transformed to strain energy in the pole as the pole bends after takeoff. This strain energy is then released to the vaulter in the form of potential and kinetic energy as the pole uncoils. Work done by the vaulter also adds to his potential energy and increases the height he attains. The maximum height achieved by a vaulter is thus a function of: (1) the amount of energy possessed by the vaulter at takeoff; (2) the amount of energy lost during the vault due to friction, inelastic stretching, etc.; (3) the amount of work done by the vaulter during the vault; and (4) the amount of kinetic energy not transformed to potential energy when the vaulter reaches maximum height. The purpose of this study was to describe the energetics of the pole vault and determine relationships between the work and energy variables described above with pole vaulting success. High speed 16mm cameras were used to record competitive vaults by 30 athletes vaulting at crossbar heights of 5.19m to 5.80m. The 2-dimensional film records were digitized and the resulting data analyzed to determine work, energy, and power variables associated with the vaulter. Significant correlation coefficients ($\underline{p}<.05$) existed between crossbar height and total energy (TE) at touchdown, TE at plant, TE at takeoff, time of minimum TE, maximum power, and kinetic energy (KE) at maximum height. The TE a vaulter has at the beginning of the vault is the most important determinant of success in the pole vault as indicated by the significant correlations between crossbar height and TE at touchdown, TE at plant, and TE at takeoff. As expected, KE at maximum height was negatively correlated with crossbar height. The most significant correlation was between crossbar height and maximum power. This variable is the sum of the rate of release of energy from pole to vaulter and the rate of work done by the vaulter. The high positive correlation indicated that at higher heights the rate of transfer of energy from pole to vaulter is greater (the pole straightens more quickly) and the vaulter does more work in less time.

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Thursday, April 16
3:45-5:30 p.m.

RELATIONSHIP BETWEEN MUSCLE ACTIVATION AND JOINT MOMENTS DURING JUMPS PERFORMED FROM FIVE STARTING POSITIONS. Rick N. Robertson, University of Oregon; Kathy J. Simpson, University of Oregon; Peter M. McGinnis, University of Oregon,

The purpose of the present study was to investigate the relationship between the electromyographical (EMG) activity for selected leg and thigh muscles and joint moments produced during 4 types of jumping. Four male subjects performed 5 maximum vertical jumps from 5 starting positions. The jumps were designated as squat jump (SJ), counter-movement jump (CMJ), drop jump one (DJ50cm), drop jump two (DJ75cm), and running jump (RJ). Each subject randomly performed all 5 types of jumps while being filmed with a LOCAM camera set at 100 f.p.s. EMG data from 6 muscles (gluteus maximus, biceps femoris, vastus lateralis and medialis, soleus, and lateral head of gastrocnemius) were simultaneously collected utilizing a TRANSERA A-D converter interfaced with a 4052 TEKTRONIX computer. Joint moments were determined from film and anthropometric data. EMG data were rectified and scaled prior to the calculation of integrated and slope values. A sliding window of EMG slope and integrated values were correlated to instantaneous torque values. Optimal window sizes and step intervals were determined for each EMG-torque set of correlations. Strong relationships were shown to exist for most EMG-joint moment correlations, determined at the joint crossed by the muscle. Relative weightings of the EMG were correlated with total impulse. It was hypothesized that this relationship could be used to establish the relative contribution and summation effect of the active muscles to the total impulse. The activation response of selected leg muscles during 5 types of jumping was shown to be strongly related to joint moments and to the impulse produced during the jump. Additionally, changes in activation, in relation to the concentric/eccentric phases of the jump and to produced impulse implied that energy stored and subsequently recovered from the series elastic component differed as a function of the loading condition.

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Thursday, April 16
3:45-5:30 p.m.

A BIOMECHANICAL ANALYSIS OF FOUR SPRINT START POSITIONS. Philip K. Schot, Kathleen M. Knutzen, Western Washington University, Bellingham, Wash.

The purpose of this investigation was to examine the effects of four sprint start positions on the kinematics of the starting action and on the ground reaction forces of the first step. The results of the kinetic analysis will be presented. Six male and six female sprinters/hurdlers, aged 19 to 24 years, performed five successful starts from each of four test conditions. All conditions were standardized with respect to leg angles and anteroposterior separation of the feet in the starting blocks. The four start positions were: (1) elongated foot placement (60%) with neutral shoulder positioning, (2) elongated foot placement with a forward shoulder lean, (3) bunched foot placement (49%) with neutral shoulder positioning, and (4) bunched foot placement with a forward shoulder lean. The ground reaction force data were collected during the support phase of the first step using an AMTI force platform system sampling at 500 Hz. The digital values for the three force components were individually scaled and normalized for body weight. Specifically designed curve analysis software identified 14 vertical, 13 fore-aft, and 16 mediolateral variables for each of the force curves. Mean values were computed across the five trials for each of the four conditions. A multivariate analysis of variance with repeated measures (MANOVA) was applied to assess differences across the four start positions and differences between sexes. All tests were conducted at the .05 level of significance. The results of the MANOVA identified significant differences in the vertical and fore-aft ground reaction forces. Vertically, the bunched start positions produced faster support times and achieved the first minimum force earlier in the support phase than the elongated positions. However, the elongated positions were shown to generate greater forces during the forefoot loading. In the fore-aft direction, the bunched positions achieved maximum braking and propelling forces earlier in the support phase than the elongated positions. The elongated positions demonstrated greater propelling impulses than the bunched positions. Additionally, males demonstrated significantly greater forces than females. In conclusion, while the bunched start positions were shown to achieve maximum force values earlier in the support phase, the elongated positions were shown to be more efficient in producing propelling impulses and thereby contributing to greater accelerations out of the starting block.

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Thursday, April 16
3:45-5:30 p.m.

KINEMATIC MODIFICATIONS DUE TO SPEED CHANGES DURING WHEELCHAIR PROPULSION.

William L. Siler, Philip E. Martin, and Michael Mungiole, Exercise and Sport Research Institute, Arizona State University.

A large population relies upon the use of a wheelchair for basic transportation. Unfortunately, little research has focused on the mechanical aspects of wheelchair locomotion. This information is important in considering the physical limitations of the wheelchair operator which ultimately has implications for wheelchair design. The purpose of this study was to investigate the influence of speed of movement upon temporal, kinematic, and kinetic characteristics of wheelchair propulsion. Wheelchair-dependent males (n=13) were filmed at 80 frames per second while freely choosing slow ($\bar{X}$=1.14 m/s), normal ($\bar{X}$=1.82 m/s), and fast ($\bar{X}$=3.05 m/s) speeds. Results demonstrated that speed increases were accompanied by an increased rate of cycle generation ($\bar{X}$=0.83, 1.03, 1.74 cycles/s, for slow, normal, and fast, respectively) and increases in the amount of work done on the arm (21.78, 30.31, 93.97 J). While subjects showed a consistent increase in cycle distance from the slow ($\bar{X}$=1.38 m) to the normal ($\bar{X}$=1.79 m) condition, there was no further increase for the fast condition ($\bar{X}$=1.77 m). Further analysis revealed a significant relationship between the level of injury, represented as an interval measurement, and the fast speed chosen (r=0.73), such that individuals with lower injuries demonstrated higher speeds. In addition, subjects with lower injuries displayed higher rates of cycle generation, primarily due to a reduced time spent in the glide phase. An analysis of the angular patterns of the upper arm and forearm revealed that speed increases were accompanied by an increased range of motion at the shoulder and a more flexed arm during the recovery phase, particularly with the increase in speed from normal to fast. Because of the increased cycle rate and decreased glide time, it is suggested that the more flexed arm position, which reduces the moment of inertia of the arm, facilitates a rapid recovery of the extremity for the next propulsive phase. It was concluded that all subjects exhibited similar strategies of wheelchair propulsion while travelling at slow and normal speeds. At the high speed, however, subject differences became more apparent with level of injury apparently serving as an important mediating factor.

Supported by an NIH Institutional Biomedical Research Grant.

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Thursday, April 16
3:45-5:30 p.m.

"A Comparison of Selected Mechanical Factors in Male Baseball and Female Fast Pitch Softball Batting." Carolyn Spragg and Larry Noble, Kansas State University.

The purpose of this investigation was to compare selected mechanical factors in male baseball and female softball batters in an effort to determine the extent to which research utilizing male batters can be applied to female batters. Six female intercollegiate varsity softball players and six male intercollegiate varsity baseball players volunteered as subjects for this study. Each subject was observed while batting a wiffle ball off of a batting tee at hip height. Subjects were filmed from overhead at 100fps with an intermittent pin-registered camera and lead foot forces were recorded with an LVDT force platform. The best three trials out of ten recorded were analyzed for each subject. Ground reaction forces in the lead foot in the lateral and vertical planes and torque about the vertical axis were measured and synchronized with the subjects' batting movements. Specific variables selected for comparison were hip and trunk rotation, linear and angular velocities and accelerations of the upper body segments and bat, and the timing sequence of maximum velocities achieved by each segment and the bat center of percussion relative to bat-ball impact. Film data were entered into a minicomputer using a Grafpen digitizer. All coordinate series were smoothed using a second order dual low-pass Butterworth digital filter with a frequency cut-off value of 15 HZ. The finite difference method was used to calculate velocities and accelerations. Each subject group means for males and females were compared using the t-ratio for independent samples. The .05 level of significance was used for decision making purposes. The results of this investigation indicated no differences between male and female lead foot forces or twist torque when expressed as percent of subject body weight. Males had significantly higher peak linear and angular velocities for all body segments measured, except for hip angular velocity. Females reached peak segmental velocities in a different sequence than males, who followed the kinetic link mode. Males' hip, trunk and left arm peak velocities occurred at mean times of .0959s, .0767s and .0733s prior to ball contact (PC). The females' sequence was left arm (.0967s PC), hip (.0736s PC) and trunk (.0706s PC). Mean male bat maximum linear velocity at the center of percussion was significantly faster than for females (male x = 38.42 +/-1.545 ms-1; female x = 32.57 =/-2.478 ms-1). Bat kinematics followed similar patterns and magnitudes as reported by other researchers. The results of this investigation suggest that both body structure and technique may account for the faster bat velocities of males.

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Thursday, April 16
3:45-5:30 p.m.

THE EFFECT OF SHOE HEIGHT AND ATHLETIC TAPING ON SUBTALAR JOINT SUPINATION DURING LATERAL MOVEMENT. D. H. Sussman, University of Northern Iowa, J. Hamill, University of Massachusetts, M. Miller and D. Hong, Southern Illinois University, Carbondale.

Controlling the amount of subtalar joint supination has been cited as a health concern by researchers and clinicians. In basketball, high basketball shoes and athletic taping generally have replaced low basketball shoes in order to reinforce the integrety of the lower extremity during the movements exhibited in basketball. The purpose of this study was to investigate the effects of shoe height and ankle taping on rearfoot motion and knee flexion during lateral movement. Eight healthy female adult women volunteered as subjects for this study. The experimental set-up consisted of a LoCam camera equipped with a 100 Hz pulse generator to verify film speed. Subjects began each trial at a left boundary marker and moved laterally for 3 steps as fast as possible to the right boundary where a silver fronted mirror was positioned at a 45 degree angle to the lateral border of the rectangular experimental "runway". The camera was situated 11 m from the right border of the runway and perpendicular to the plane of movement. Subjects were filmed from the rear when they reached the right border markers producing rear and side views of the leg and foot. Data sampling was accomplished at 100 Hz, and took place on the 3rd, 4th, and 5th trials in the conditions of low shoes without tape (LS), low shoes with tape (LT), high shoes without tape (HS), and high shoes with tape (HT). The rearfoot and relative knee angles were obtained from the digitized film data. Mean values for 3 footfalls for touchdown angle (TD), maximum supination (MS), time to maximum supination (TMS), total rearfoot movement (TM), maximum knee flexion (KF), and time to maximum knee flexion (TKF) were generated. Mean values for each of the levels of shoe height and ankle taping were evaluated using a 2 X 2 ANOVA. It was found that the high shoe conditions did significantly decrease TMS ($\overline{X}$ = 330.44 ms) compared to the low shoe conditions ($\overline{X}$ = 452.63 ms). The results further revealed that the taped conditions permitted less MS ($\overline{X}$ = 19.22°) compared to the untaped conditions ($\overline{X}$ = 22.75°). These data provide a further basis for the investigation of the mechanisms of excessive supination and possibly lower extremity injury in basketball as a function of shoe height and ankle taping.

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Thursday, April 16
3:45-5:30 p.m.

PREDICTING PLANTAR FASCIITIS IN DISTANCE RUNNERS. Barbara L. Warren and C. Jessie Jones, University of New Orleans.

Ninety-one runners were studied to determine whether specific variables were indicative of runners who had suffered with plantar fasciitis either presently or formerly versus runners who had suffered with plantar fasciitis. Each runner was asked to complete a running history, subjected to several anatomical measurements, and asked to run on a treadmill in both a barefoot and shoe condition at a speed of 3.35 mps (8 min mile pace). Factor analysis was used to reduce the numerous variables into factor coefficients. Factor coefficients were used in a discriminant function analysis which revealed that when group membership was predicted, 63% of the runners could be correctly assigned to their group. Considering that 76% of the control group was correctly predicted it was concluded that the predictor variables were able to correctly predict membership of the control group, but not able to correctly predict the presently or formerly injured sufferers of plantar fasciitis.

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Thursday, April 16
3:45-5:30 p.m.

A CINEMATOGRAPHICAL COMPARISON OF THE OVERHAND THROWING MOTION AND THE TENNIS SERVING MOTION IN ADOLESCENT CHILDREN WITH MATURE MOVEMENT PATTERNS.

H. Mardi Johnson and Carole J. Zebas, University of Kansas, Lawrence, Kansas.

If, in the course of teaching a new movement pattern the pattern of a previously learned task with similar movements can be incorporated, the learning process should be more rapidly achieved. The overhand throw often has been used to teach the tennis serve. Previous literature has suggested that the muscular activities between the two motions were similar; however, the biomechanical relationships have not been studied extensively. It was the purpose of this study to cinematographically compare the overhand throwing motion and the tennis serving motion of adolescent children with mature movement patterns. A 2-camera (LOCAM) set-up (100 fps) was used to film 17 throws and 17 serves. A computer analysis provided the information to describe the kinematic parameters. An inter-correlation was used to reduce the original number ($n=19$) of kinematic variables for subsequent T-test analysis. By eliminating like variables, the number of variables was reduced to seven. The results of the descriptive analysis revealed similarities in the basic movement patterns of the overhand throwing motion and the tennis serving motion. These similarities included the backswing, trunk rotation, and follow-through. The T-test results indicated four variables (angle of shoulder in the final cock position, angle of shoulder during release/contact, angular velocity of the upper arm, and absolute velocity of the hand) to be non-significant ($p >.05$). The remaining three variables (time phase between the final cock and the release/contact, trunk inclination, and displacement of the lower arm) were significantly different ($p <.05$). It was concluded that (1) though the cock angles of the arm were dissimilar, the release/contact angles of the arm were similar; (2) the absolute velocity of the hand in the two motions differed prior to release/contact, but during release/contact there was no difference; (3) the greater range of motion produced from the addition of a racquet in the serve explains, in part, the differences found in the displacement of the arm segments and the trunk inclination; and, (4) the movement patterns were similar with respect to the backswing, body rotation, and follow-through with the difference being in the magnitude of the movement patterns. There appears to be a positive implication for teaching a tennis serving motion from an overhand throwing motion.

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Thursday, April 16
3:45-5:30 p.m.

THE EFFECT OF AROUSAL AND FOCUSED ATTENTION ON WARM-UP DECREMENT,

Mark H. Anshel, New Mexico State University

The purpose of this investigation was to determine the relative efficacy of a number of warming-up activities performed at the end of a rest interval in reducing postrest warm-up decrement (WUD) in performance on a criterion baseball batting task. Forty female varsity softball players, 24 from a Division I university and 16 advanced intramural participants, practiced 20 trials of batting with a standard pitching machine and then rested for 15 minutes. During the last 5 minutes of rest an equal number of subjects read magazines (control), pedalled a bicycle ergometer (arousal), visually imaged themselves hitting pitched balls (relevant imagery), or visually imaged themselves catching fly balls (irrelevant imagery). Postrest performance involving 10 trials of batting with the pitching machine revealed higher levels of WUD for the control and irrelevant imagery conditions rhan for the arousal and relevant imagery conditions using the number of successful contacts, distance of ball traveled, and coach's ratings of swing quality as the dependent variables. A second warm-up period followed by 10 trials of batting occurred 6 months later with no resultant significant differences in WUD between conditions. The results suggested (a) support in a field setting for the activity-set hypothesis for WUD (Nacson & Schmidt, 1971), (b) that attention and arousal may be important features of the activity set, and (c) that practicing attentional and arousal adjustments immediately prior to entering an athletic contest may be one way the coach could assist athletes in adjusting from bench to game conditions.

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Friday, April 17
9:00-10:15 a.m.

EXPOSURE TO DIFFERENT RANGES OF AUDITORY STIMULUS INTENSITIES AND ITS EFFECT UPON MOTOR RESPONSE PROCESSING.

Pamela J. Hoyes Beehler, University of Texas at Arlington
Gary Kamen and Harold H. Morris, Indiana University

Although previous investigations have shown that motor response processing (reaction time-RT, premotor time-PMT, and motor time-MT) is affected by stimulus intensity and research design, different ranges of stimulus intensities have not been addressed. The purpose of this study was to examine the RT response to varying auditory stimulus intensities to determine if motor response processing was affected by exposure to different ranges of auditory stimulus intensities based on the experimental design (between-subjects: BS, within-subjects: WS). Eighty college-age subjects were screened for normal hearing responses prior to testing. Subjects were randomly assigned into one of 10 experimental groups. Four BS groups received one A stimulus (30, 50, 70, or 90 dB SPL), while six WS groups randomly received two A stimuli (30-50, 30-70, 30-90, 50-70, 50-90, or 70-90 dB SPL). Each group received fifty-six RT trials/day given over a 2 day testing period. These 56 trials were delivered in two 28 trial blocks with 3 catch trials per block. Subjects were seated in a sound attenuated chamber with the right forearm placed pronated on an elbow flexion apparatus with the elbow at 30 degrees (0 degrees = full extension). Surface electrodes were placed on the belly of the right biceps brachii muscle to aid in RT fractionation. The response consisted of rapid right elbow flexion. Erlebacher's (1977) ANOVA model was used to analyze the factorial arrangement of stimulus intensity range and research design, which allowed the important interaction between stimulus intensity range and research design to be explored. No significant interactions were found between stimulus intensity range and experimental design for any of the criterion measures (RT, PMT, and MT), $p>.05$. Increasing stimulus intensity did enhance RT, PMT, and MT when different ranges of auditory stimulus intensities were utilized in the BS and the WS designs ($p<.05$). Economically, the researcher may confidently choose the WS design over the BS design without regard to biased design effects when investigating the enhancing effects of exposure to different ranges of auditory stimulus intensities upon motor response processing.

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Friday, April 17
9:00-10:15 a.m.

EFFECT OF PERCEPTUAL STYLE DIFFERENCES ON THE ACQUISITION OF A NOVEL MOTOR TASK.

Cathy Buell, Frank Pettigrew, & Stephen Langendorfer, Kent State University.

Many factors such as practice, feedback, motivation, and individual differences effect the acquisition of motor skills (Sage, 1984). Variance associated with individual differences often has been ascribed to such factors as self-concept or perceptual and learning styles. The purpose of this study was to examine perceptual style preference differences and the rate of acquisition of a novel motor task; specifically it asked whether persons indicating high degrees of perceptual preference in several perceptual styles learned the motor task differently than persons indicating lower degrees of preference. A sample of 98 junior high students were administered the Physical Needs element of the Learning Style Inventory [LSI] to determine the strength of their perceptual preferences for processing auditory, visual, kinesthetic, and tactile information (Dunn, Dunn, & Price, 1978). Subjects were introduced to the tennis ball basket bounce test via a videotape demonstration. The goal of the task was to bounce a tennis ball once from the foul line and have it go through a standard basketball hoop. From 0 - 5 points were awarded for varying degrees of success in the task. Subjects then practiced the task 8 times (3 practice and 5 test trials) per day for 9 days. Subsequent to all practice and testing, 45 of the original 98 subjects were selected according to degree of perceptual preference: subjects in the top 25% on all perceptual preference modes (n= 15); in the bottom 25% on all modes (n=14); and at the median (50%ile) on all modes (n= 16). Scores on the ball bounce task were then compared across groups using a one way ANOVA. There were overall significant differences ($p > .0001$) between perceptual preference groups. In addition, there were day-by-day differences between groups (ranging from $p > .02$ to .04). Finally, although all groups improved across days, a disordinal interaction resulted with those subjects expressing high degrees of preference in all perceptual modes increasing at a significantly faster rate ($p > .0001$) than those with either moderate or low degrees of preference. The results indicate that perceptual style as measured by the LSI is a potentially important factor in motor skill acquisition. Both researchers and practitioners should give the perceptual style of learners serious consideration in further research studies as well as being employed as a pragmatic factor for individualizing physical education teaching.

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Friday, April 17
9:00-10:15 a.m.

THE INTERRELATIONSHIP BETWEEN TASK VARIABLES AND PERFORMANCE VARIABLES IN ACCURATE RAPID MOVEMENTS.

Daniel M. Corcos, Gerald L.Gottlieb, and Gyan C. Agarwal, Rush Medical College

Studies in motor control often analyze the relationship between one or more independent variables (task variables) and one or more dependent variables (performance variables). Such experiments give rise to two sets of relationships. The first relationship is that between task variables (e.g. moving different distances) and performance variables (e.g. changes in agonist EMG quantity). The same experiment also gives rise to a relationship between two performance variables such as that between movement velocity and agonist EMG quantity. Two experiments were conducted in which subjects made movements over different distances to different size targets and over different distances against different inertial loads. A normalized composite task index was then developed through stepwise regression procedures in which various performance variables (movement time, peak velocity, agonist and antagonist EMG quantities) were related to task variables. That task index is: $P_V = \Sigma\beta_i TV_i$ where P_V is a performance variable (such as movement time or peak velocity) and TV_i are task variables (distance, target width or load) and β_i are the standardized regression coefficients. This relationship can be generalized by considering any set of task variables. When this is done and performance variables are substituted for task variables, seemingly contradictory correlations can arise when the task variables affect the performance variables differentially. For example, velocity and agonist EMG quantity (two performance variables) have a high positive correlation when movement distance is the task variable whereas they have a high negative correlation when inertial load is the task variable. This change in the relationship between two performance variables when different task variables are manipulated is a warning that even a strong correlation between performance variables does not demonstrate a causal relationship and some deeper relation presumably waits to be found. The use of a task index to describe behavior is a more general way of organizing the rules of voluntary motor control. (Supported in part by NIH Grant 23593 and AM 33189).

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Friday, April 17
9:00-10:15 a.m.

AUDITORY MODELING IN A TIMING TASK: TRANSFER AND RETENTION EFFECTS

S.G. Doody, University of Northern Iowa; D. Ross, California State University-Fullerton; A.M. Bird, California State University - Fullerton; S. Huddleston, University of Northern Iowa

The purpose of this study was to examine further the effectiveness of auditory modeling in the acquisition of a timing task. It was hypothesized that, both on immediate transfer and after an extended retention interval, auditory modeling would yield smaller performance errors than either visual modeling or physical practice alone. Subjects (N=60) were assigned to one of the four groups demanded by the 2 x 2 (auditory model x visual model) design. That is, subjects were provided with an auditory model, a visual model, an auditory+visual model, or no model of correct performance. The task was to use the right hand to topple seven small barriers in a prescribed sequence in exactly 2100 ms. During acquisition, subjects in the modeling groups were given four presentations of the appropriate model followed by two physical practice trials. This sequence was repeated 10 times. Subjects in the no-model group performed 60 physical practice trials. Knowledge of results (KR) was given for all acquisition trials. After a 2 min rest (transfer) and again after 48 hrs (retention) 18 test trials were administered. No models or KR were provided during the transfer or retention tests. Overall error (E) was subjected to analysis of variance for each phase of the experiment. Subjects' performance, as reflected in E, improved over trial blocks during acquisition ($\underline{F}(9,504)=45.37$, $p<.001$). Subjects who experienced an auditory model had lower E (M=110 ms) than those who had no auditory model ($\underline{M}$=135 ms). This effect was significant as $\underline{F}(1,56)=4.64, p<.05$. For immediate transfer, the effect of trial blocks was significant ($\underline{F}(5,280)=4.2, \underline{p}<.05$). E increased from 94 ms on trial block one to 125 ms on trial block six. The main effect of auditory model was again significant ($\underline{F}(1,56)=4.03$, $\underline{p}<.05$) as the auditory groups' mean E was 101 ms and the no-auditory groups' mean E was 135 ms. Neither the main effect of visual model nor any of the interactions was significant. For the retention data, no main effects or interactions were significant. The advantage of auditory modeling noted during acquisition and immediate transfer was apparently lost over the two-day retention interval. Auditory modeling, combined with physical practice, seems to provide at least as effective a cognitive representation of a timing task as does either visual modeling or physical practice with KR, however.

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Friday, April 17
9:00-10:15 a.m.

FLEXIBILITY CHARACTERISTICS OF ELITE FEMALE AND MALE VOLLEYBALL PLAYERS.

Bruce R. Etnyre, Eva J. Lee, Hally B.W. Poindexter, Debra L. Sokol, Rice University.

Numerous studies have shown relationships between performance and strength, endurance and anthropometric measures of elite athletes. It is a common assumption that increased range of motion is related to high level performance, however, few studies have provided conclusive evidence for this assumption. The purpose of this study was to compare shoulder and hip flexibility to jumping height of members of the men's and women's 1986 Olympic Festival volleyball teams. Twenty-four men and twenty-two women were measured for standing vertical jump (SVJ) and approach vertical jump (AVJ). A stainless steel goniometer was used to measure range of shoulder extension (SHO) and hip flexion (HIP). Multiple regression analysis was used to compare the two jumping measures with range of motion measures. A probability of .05 was selected as the level of confidence for all comparisons. Average scores of the men were: SVJ = 27.3, AVJ = 31.4, SHO = 32.2, HIP = 87.3. Women's mean scores were: SVJ = 20.8, AVJ = 24.1, SHO = 34.6, HIP = 96.1. Correlation between the two jumping measures was high for each gender (men, $r = .84$, $p = .001$, women, $r = .78$, $p = .001$). A significant and positive correlation was revealed between approach jump and hip range of motion for the men ($r = .51$, $p = .01$). Significant and negataive correlations resulted between SVJ and HIP ($r = .54$, $p = .009$) and between AVJ and HIP ($r = -.47$, $p = .03$) for the women. Although a positive correlation between flexibility and AVJ observed for the men supported the assumption that greater flexibility is related to greater skilled performance, the opposite results occured for the women. The negative correlations for the women indicate that the players with the greatest vertical jumps had the least hip flexibility. This agrees with previous findings of women's Division I College volleyball players. Because women are generally more flexible than men the combination of results for the men and women suggest that perhaps an optimal level of flexibility exists upon which the highest skilled of both sexes is converging. Another possibility is that flexibiity is related to the anatomical differences of the hip joint between the sexes and that flexibility increases of the hip joint are more beneficial for men.

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Friday, April 17
9:00-10:15 a.m.

SIMPLE ONE-HAND CATCHING IS REALLY NOT SO SIMPLE. Mark G. Fischman and Josefa Sancho, Southern Illinois University.

This experiment extends the recent work of Fischman and Schneider (1985) in simple one-hand catching. They reported that both skilled and novice performers dropped more balls when vision of the catching limb was screened, compared to normal catching. More important, though, was the finding that the increase in the number of positioning errors made by novice catchers was much greater than that of skilled subjects when sight of the catching hand was prevented. Presumably, this is because the novice does not use articular proprioception as adeptly as the skilled performer. However, an alternate view holds that novices may need more time to view the ball prior to executing the positioning and grasping movements of the catch than do skilled performers. The present experiment tested this idea by adding the variable of ball velocity to the basic design of Fischman and Schneider (1985). Varsity baseball and softball players ($\underline{N}$ = 24) and novice catchers ($\underline{N}$ = 24) attempted 20 left-hand catches of tennis balls under four conditions: slow (21 mph) and fast (27 mph) velocities, with and without the presence of a screen to block the sight of the catching hand. Balls were projected a distance of 8.83 m by a pitching machine. A 2 x 2 x 2 x 2 (Skill Level x Screen Condition x Ball Velocity x Type of Error) ANOVA revealed a significant three-way interaction among screen condition, ball velocity, and type of error. Lack of sight of the catching hand caused a similar disruption in the position phase of the catch regardless of ball velocity and skill level, but it caused a greater disruption in the sensitive grasp phase at the slower velocity compared to the faster velocity, regardless of skill level. This interaction presents a new an unexpected feature of one-hand catching, for which there are several possible explanations. First, in the screen condition subjects are without sight of the ball for a longer period of time at the slower velocity compared to the faster velocity. Therefore, the timing of precisely when the fingers have to close in order to hold the ball is more affected by the occluded period. Second, because the projection distance was held constant, the slower velocity balls followed a higher, more curved trajectory than did the faster velocity balls. This may have also made it more difficult for subjects to predict when to initiate finger closure in order to achieve a successful grasp. Thus, our attempt to simplify the task by slowing the ball's velocity did not prove fruitful. We suggest that the act of one-hand catching is really not as simple as may have previously been thought.

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Friday, April 17
9:00-10:15 a.m.

The effects of contextual interference on the acquisition and retention of three volleyball skills. K.E. French, J.E. Rink, and P.H. Werner, University of South Carolina.

Previous research has shown that a random practice schedule as opposed to a blocked schedule of practice facilitates the retention and transfer of motor skills. Most of the research has been conducted in laboratory settings using laboratory tasks. Generalization of the findings of such studies to real world applications may be premature. The purpose of this study was to examine the effects of contextual interference on the retention of three volleyball skills learned in an ecological valid environment. One hundred fifty high school students were pretested using the tests for the forearm pass, overhead set, and the serve outlined in the AAHPERD Volleyball Skill Test Manual (1984). Each subject was classified as high, average, or low skill based upon their pretest score. Subjects in each skill level were randomly assigned to nine groups. Three groups were assigned to one of three teachers. Each teacher taught one group under one of the practice conditions, either random practice, blocked practice, or random blocked practice. Every group practiced each skill for 90 trials over a period of three weeks in either a random, blocked, or a random blocked order. All subjects were posttested at the end of three weeks. The retention trials were presented in a blocked manner because skill tests given in public schools are generally presented in a blocked format. The data were analyzed in a randomized block design with teachers as a blocking factor. The treatments were arranged in a 3 (group) x 3 (skill level) x 2 (pre-post) factorial ANOVA with repeated measures on the last factor. The pre-test and posttest scores of the forearm pass, overhead set, and the serve were used as dependent variables. The results of the analysis revealed significant effects for skill level, time of testing, and the skill level x time of testing interaction for all three dependent variables. Examination of the interactions revealed that low skill subjects exhibited greater improvement than average or high skill subjects on all three skills. The effects of practice group, teacher, and other interactions were nonsignificant. The results indicate that there was no advantage for a random practice schedule for these three tasks. In addition, the three teachers reported that the random condition was more difficult to manage. Much time was spent moving from task to task. These results suggest that further research is needed before teachers employ random practice schedules in physical education classes.

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Friday, April 17
9:00-10:15 a.m.

Induced Biases in Limb Movements: A Source of Errors.

Charles Shea, Robert Kohl and Mark Guadagnoli; Elouise Beard Smith Human Performance Laboratories, Texas A&M University.

Muscular biases have been induced consistantly under experimentally manipulated conditions. Sapirstein, Herman, and Wallace (1937) demonstrated that after maintaining a substained voluntary contraction, misjudgements of limb position resulted in the direction of contraction. Sapirstein, et.al., argue that this effect eminates from many components of the central motor system. In a more recent study, Shebilske (1984), in manipulating the occular motor system, found that innervation patterns that would normally achieve a particular eye position are selectively potentiated in the direction of the induction. Shebilske inferred this effect to be driven by posttetanic potentiation. In accordance, the present study investigated the influence of posttetanic potentiation on the control of arm movements. S's attempted to strike the padded arm of a force transducer with 200N of force. On each "hit", errors were displayed in real time on a computer monitor as a deviation above (too much force), below (too little force) or on (correct force) a "target line". Each block was immediately preceded by an induction task which required S's to apply static pressure to the transducer pad for 30 seconds. A 10% MVC (approximate weight of the S's hand) was required on a total of 24 blocks, and 40% MVC was required on 4 of the last 12 blocks. Analysis indicated little tendency for S's to "overshoot" or "under shoot" the target line on blocks preceded by a 10% induction. However, a strong tendency to "overshoot" on blocks preceded by a 40% induction was noted. The influence of the induction diminishes rapidly after 3 to 4 hits (negatively accelerating slope) of a block. These data are interpreted within the same framework as Shelbilske's explanation, that the motor system may be biased peripherally and that individuals apparently do not compensate for this bias centrally, prior to feedback. Further ramifications lead to the effects of such potentiation on learning.

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Friday, April 17
9:00-10:15 a.m.

IMPORTANCE OF THE TRANSFORMING OPTICAL ARRAY.

Kathleen Haywood, Physical Education, and Matthew Shank, Psychology, University of Missouri-St. Louis.

There are presently two distinct views of skill performance, particularly the perceptual aspects of skill. One is the information processing perspective wherein the performer carries out complex elaborations of perceptual input. Retinal images are discrete samples, recreated from sensations with the aid of memory. The alternate perspective is direct, or ecological, perception wherein stimulus input provides all the information needed for perception. Visual information is contained in a transforming optical array. The present experiment was conducted as a test of the efficacy of these two perspectives. Undergraduate subjects (N=24) were asked to perform a Bassin Coincidence-Anticipation Task at various stimulus speeds with parts of the runway masked. The condition consistent with the information processing viewpoint had the runway masked periodically, three lights covered and two lights visible alternately the runway length with a total of 18 lights masked. The condition consistent with the direct perception viewpoint masked 18 lights at the end of the runway with 12 lights at the beginning visible. The latter allowed a transforming optic array to be visible to the subject while the former did not. Subjects responded for 24 trials, 12 in each condition, with the initial condition counterbalanced. Performance was measured by a ratio error allowing comparison across three stimulus speeds. A treatment by speed (2 X 3) ANOVA with repeated measures on each factor was conducted. Although the error was higher in the end-masking condition than the periodic-masking condition, 12.6% versus 10.7% respectively, there was no significant difference in performance for either factor nor their interaction. Neither viewpoint was upheld at the expense of the other. However, the masking conditions proved relative in that the periodic-masking condition, particularly at faster stimulus speeds, could still provide a transforming optic array. Further investigation with other masking combinations is therefore warranted.

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Friday, April 17
9:00-10:15 a.m.

CHANGES IN RESTING ELECTROMYOGRAPHIC TRICEPS SURAE ACTIVITY AND TONIC VIBRATION REFLEXES IN ENDURANCE TRAINED SUBJECTS FOLLOWING A MAXIMUM AEROBIC CAPACITY TEST.

Robert S. Hutton, University of Washington; T.L. Doolittle, University of Washington.

Relatively brief periods of moderate to high intensity muscle contractions trigger a number of potentiating factors, intrinsic to spinal reflex circuits, that result in enhanced muscle force production to subsequent activation. In contrast, repetitive exercise has been reported to induce a "tranquilizing" effect as evidenced by reduced muscle activity. These seemingly diametric results incurred by the same stimulus (exercise) were further explored in trained and untrained human subjects. To determine the acute effects of intense exercise on electromyographic (EMG) activity in endurance trained subjects, vis-à-vis a control population, resting EMG and tonic vibration reflex (TVR) EMG responses in triceps surae musculature were monitored immediately before and after a treadmill test for determination of maximal aerobic capacity in endurance trained (n = 12) and untrained (n = 9) or sprint trained (n = 2) females. Subjects were categorized as having either average-low $\dot{V}O_2$ max ($\leqslant$ 43 ml/kg/min) or high $\dot{V}O_2$ max ($\geqslant$ 50 ml/kg/min) capacities using guidelines established by Cooper (1970). Postexercise resting EMG amplitudes either remained unchanged or were decreased with no significant trend (non-parametric, sign test) for both groups. In contrast, both groups showed significant increases ($p < 0.05$) in paroxysmal EMG burst activity, suggesting heightened myoelectric responses to ongoing tonic activity. Acute heightened irritability in postexercise resting EMG activity is not in accord with the view that exercise promotes a "tranquilizing" effect. However, the high $\dot{V}O_2$ max group showed a significant postexercise decrease ($p < 0.05$) in TVR EMG amplitude and rate of rise in EMG reflex activity. A similar postexercise change in the TVR EMG pattern was not seen in the lower fit group. This suggests that a possible reflex and/or a voluntary chronic adaptive response to exhaustive exercise may occur in endurance trained athletes involving control over TVR polysynaptic reflex pathways. Such adaptive TVR responses in trained athletes have not been previously investigated. Furthermore, a potential training-dependent and intensity-dependent postexercise change in resting and/or TVR EMG magnitudes introduces additional considerations for the assessment of the role of exercise in promoting relaxation when using EMG as the dependent variable.

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Friday, April 17
9:00-10:15 a.m.

VISUAL PERCEPTION, RECOGNITION, RECALL AND MODE OF VISUAL SEARCH CONTROL IN BASKETBALL INVOLVING NOVICE AND EXPERIENCED WOMEN BASKETBALL PLAYERS. Duane G. Millslagle, Northern State College.

The primary purpose of this study was to examine the visual search abilities of experienced and novice women basketball players utilizing a visual search paradigm. An attempt was made to: (a) compare the speed and accuracy of detection and recall ability between both types of players, and (b) compare the visual search performance of experienced and novice basketball players in structured and unstructured basketball situations. A secondary purpose was to examine how experienced and novice basketball players control their visual search process (target or context) through the adoption of Prinz's et al. (1974) hurdle paradigm.

Thirty female college students consisting of 15 experienced and 15 novice basketball players served as subjects. Sport slides consisting of 32 structured and 32 unstructured basketball situations were used as the stimuli. Sixteen of each situation, structured or unstructured, contained a target item (basketball). Sixteen of each situation contained a hurdle item (orange triangle). Each subject scanned the sport slide projected for a 5-second period. Speed and accuracy of ball detection were measured by the subject response to presence or absence of the target item (basketball) by depressing a yes or no key positioned in front of the subject. After the 5-second viewing, players recalled as many players as possible on a grid depicting the basketball court. The subjects' decision times and recall of the presence of the hurdle item was used to determine the subjects' mode of control in visual search.

Two randomized repeated measures design ANOVA models were used as the basis for the analysis of the three dependent variables. The findings were that: (a) visual search performance of experienced players, their overall speed of target detection and player recall, were significantly superior than that of novice players, (b) the overall accuracy in detecting the target item was similar for both experienced and novice players, (c) both groups of players could accurately detect and recall a structured play significantly better than an unstructured play, with the experienced player recall being superior in both situations, and (d) the speed of detection of both groups of players was not affected by the difference in structured and unstructured plays. The finding pertaining to the control of visual search was that the presence or absence of the hurdle item did not affect speed by experience level or accuracy of detection, indicating that the visual search of both experienced and novice players may have operated under target control.

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Friday, April 17
9:00-10:15 a.m.

THE EFFECTS OF GENDER, STIMULUS VELOCITY AND LOCATION OF STIMULUS OBSTRUCTOR ON COINCIDENCE-ANTICIPATION TIMING PERFORMANCE.

V. Gregory Payne, San Jose State University; Darryl Michael, San Jose State University.

Fifty-six males and 56 females (18-32 yrs. of age) were selected and randomly assigned to one of eight treatment situations for each gender. All subjects were administered 100 trials using a Bassin Anticipation Timer with the stimulus runway approaching directly from the front. Subjects were blocked into near obstructed (NO), middle (MO), far (FO), or unobstructed (UO) groups. The NO group viewed all but the first 20 of 65 lights on the stimulus runway. Lights 21-40 and 40-60 were obstructed, by opaque tape, from the view of the MO and FO groups respectively. The UO group viewed all lights. Subjects also were assigned to receive 6 Or 9mph stimulus velocities within their NO, MO, FO, or UO groups. This design enabled the analysis of gender, velocity, and location of stimulus obstructor main effects. Data were converted to constant (CE), variable (VE), and absolute (AE) error scores. Since pilot study findings had revealed that the first 15 trials were adaptation or learning trials, those trials were stricken from the final analysis which was designed to yield performance rather than adaptation information. A three factor (2x 2x4) analysis of variance was performed on each of the three error type distributions. The AE and VE analyses yielded significant findings for all three main effects. Generally, males performed with less error than females. Significantly less error resulted under faster velocity conditions, and error increased linearly from UO to FO, MO, and NO conditions respectively. The AE and VE analyses also yielded significant interactions for gender by stimulus obstructor and velocity by stimulus obstructor. The location of the stimulus obstructor was the only significant main effect in the CE analysis though the gender by velocity and velocity by stimulus obstructor interactions were significant.

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Friday, April 17
9:00-10:15 a.m.

FOREARM FLEXION AND EXTENSION: ELECTROMYOGRAPHIC PATTERNS.

Nancy C. Rich, Miami University.

This investigation examined the integrated electromyographic (IEMG) pattern of the agonist and antagonist muscles (biceps brachii and triceps brachii) during execution of ballistic forearm flexion and extension tasks. A total of 48 male subjects (mean age = 51.7 years) participated in the study. On each of four testing days the following data were recorded: (1) ten unresisted speed of movement trials of the flexors of one arm and the extensors of the other arm, (2) ten resisted speed of movement trials of the flexors of one arm and the extensors of the other arm. Sixteen points of the electromyographic patterns were digitized and a computer program produced 16 temporal and 10 quantitative parameters. The data were analyzed with a repeated measures analysis of variance for the determination of stabilized data and by an intraclass correlation analysis to determine the consistency of the measures. A completely randomized model was used to evaluate between task differences with repeated measures of the factors of load, side, and trials. The mean values recorded for the flexion task were significantly greater than those for the extension task for the following parameters: (1) agonist first burst duration, (2) time to maximum acceleration, (3) acceleration time, (4) accuracy, (5) agonist first burst IEMG slope, (6) IEMG Ratio, (7) latency between the agonist second burst and maximum acceleration, (8) agonist first burst peak amplitude, (9) time to maximum displacement, (10) acceleration time as a percentage of movement time, (11) agonist first burst time to peak activity, (12) antagonist second burst time to peak activity, (13) agonist second burst peak amplitude. The following parameters displayed extension values that were greater than the flexion values: (1) agonist first burst motor time, (2) antagonist first burst motor time, (3) antagonist second burst motor time, (4) antagonist second burst duration, (5) movement time, (6) latency between the agonist first burst and the antagonist second burst, (7) agonist silent period, (8) antagonist second burst peak amplitude. Significant differences were found to exist between the unresisted and resisted mean values for all but six parameters. Six parameters demonstrated significant differences between sides. The results suggest that forearm extension is a more difficult skill than forearm flexion. The data are discussed in terms of the effects of gravity upon execution of flexion and extension tasks.

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Friday, April 17
9:00-10:15 a.m.

AN INVESTIGATION OF THE ATTENTIONAL DEMANDS OF PISTOL SHOOTING. Debra J. Rose. Oregon State University.

The dual task experimental procedure was used for the purpose of determining the attentional demands of precision pistol shooting as a function of skill level. A total of 26 pistol shooters, representing novice (N=10), Sub-elite (N=10), and Elite (N=6) skill levels were selected on the basis of a priori established criteria. An Apple IIe microcomputer was used to control all aspects of the experiment and store all collected data. The hand-held microswitch which served as the secondary probe response switch and a set of speaker-equipped headphones through which the auditory tone was delivered binaurally were also interfaced with the microcomputer. Analyses of variance procedures performed on each of the dependent measures of secondary probe reaction time and performance errors revealed major differences to exist both between skill-level groups and across each of the six probe positions sampled. Post-hoc analyses tests conducted to determine the locus of these differences further revealed that the elite pistol-shooting group exhibited greater mean secondary probe reaction times across five of the six probe positions when compared to both the sub-elite and novice pistol-shooting groups. In addition, the elite pistol-shooters tended to abort a significantly greater number of trials in which a secondary probe was presented. Subsequently developed attention profiles for each experimental group demonstrated that, unlike other sports in which reduced attention demands characterize skilled performances, precision-pistol shooting demands greater attention as skill level increases. The present experiment also demonstrated the potential use of individual performer attention profiles as important diagnostic tools for identifying skill-related problems.

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Friday, April 17
9:00-10:15 a.m.

The relation of selected visual functions to batting performance of college and professional baseball players.

J.H. Spurgeon, K.E. French, University of South Carolina, J.B. Bailey, J.B. Rivers, Lexington Optometric Group, D.B. Ellisor, Columbia, YMCA

The focus of this presentation is on eye function differences between good and poor hitters on college baseball teams and on a professional baseball team (Atlanta Braves). Visual function data were collected during the spring and summer of 1984 on 78 college and 21 professional baseball players. On each subject, measures of visual acuity, horizontal and vertical phoria, stereopsis, and dynamic visual acuity, as well as eye, hand, foot dominancy, batting and fielding averages, and the number of years of organized playing participation were analyzed. The best and the poorest hitters on the college teams were identified by coaches' ratings. Three groups were formed consisting of poor college hitters, good college hitters, and professional baseball players. A stepwise discriminant analysis was used to predict group membership from the measures of eye function. The alpha level for entry was set at .05. No eye function significantly discriminated among the groups, $p > .05$. A stepwise regression was also conducted using the eye functions measurements to predict batting average. No eye function significantly predicted batting average, $p > .05$. All subjects were also classified as same side dominant or mixed dominant. Same side dominant players were defined as players who batted right handed whose dominant eye was the right eye or left handed batters with a dominant left eye. Mixed dominance was classifed as players who batted opposite the dominant eye (right batter, left eye, or left batter, right eye). There was no significant difference in the frequency of same or mixed dominant players among poor college hitters, good college hitters, or professionals. A stepwise regression was conducted using the eye function measures to predict the fielding average of all players. The alpha level for entry was set at .05. Vertical phoria was entered into the regression first, $\underline{F}$ (1, 62) = 132.58, $\underline{p} < .05$, $R = .68$. Visual acuity of the right eye was entered second, $\underline{F}$ (2, 61) = 4.22, $p < .05$, $R = .70$. Stereopsis was entered next, $\underline{F}$, (3, 60) = 5.82, $\underline{p} < .05$, $R = .72$. No other variables were significant. The results indicate that the visual functions of vertical phoria, visual acuity, and stereopsis are related to the development of fielding skills.

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Friday, April 17
9:00-10:15 a.m.

DIFFERENTIATION OF PERIPHERAL VISION MEASUREMENTS AND A BALANCE MEASURE BETWEEN CONTACT AND NON-CONTACT LENS WEARERS.

David L. Wenos, Paul R. Surburg, Richard E. Meetz, and Rory Suomi, Indiana University.

Attention has been given in the popular press and optometry literature (Gregg, 1981) to contact lens use in sport participation and also to certain peripheral vision characteristics of athletes (Stine, et al., 1982). Amblard and Carblanc (1980) concluded that peripheral vision plays an integral role in the maintenance of balance. To date, no investigations have delved into the peripheral vision threshold measurements of an individual who wears contact lenses. In addition, comparisons of motor performance have not been made between contact and non-contact lens wearers. The purpose of this study was to contrast contact and non-contact lens wearers' peripheral vision and to compare a balance measure of these groups. Peripheral vision measurements of forty subjects (18-35 yrs.) were determined with a Goldman hemispherical projection-type perimeter. Half of these subjects were non-contact lens wearers. Holding illumination constant, target size threshold was measured at 195, 225, 255, 285, 315 and 345 degrees. The balance motor task was measured on a Lafayette stabilometer where time in balance was recorded within ± 5 degrees of the horizontal plane. Subjects were directed to look at a wall-target 10 feet from the stabilometer during each balance trial. Twenty-five trials of 25 seconds in duration with interpolated rest intervals of 25 seconds were administered. The 25 trials were sub-divided into 5 blocks of 5 trials per block. Based upon trend analyses the means of blocks 4 and 5 were used as the subjects balance measure. Obtained intra-class reliability values for blocks 4 and 5 were r. = .89 and .90, respectively. A 2 x 6 (groups x degrees) ANOVA with subjects nested within groups and crossed with degrees, was conducted on the peripheral vision measurements; significant differences ($p < .05$ level) were found between the two groups for all six degrees. Results of a 2 x 2 (blocks by groups) ANOVA, for the balance measure, did not reveal any significant differences between groups ($F = 1.16$; $p > .05$) In conclusion, differences in peripheral vision measurements between contact and non-contact lens wearers were evident; there were no significant differences between the two groups for the balance measure.

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Friday, April 17
9:00-10:15 a.m.

USE OF DATA BASED GYMNASIUM TO ACQUIRE GROSS MOTOR SKILLS AMONG AUTISTIC BOYS. Paul Bishop, Kearney State College; Marie Schaepe, LaJunta Public School.

Currently there is an emphasis upon training autistic children to acquire skills that result in a greater functional competence including the performance of motor patterns and skills that can be used in play settings. Dunn, Morehouse and Fredericks have reported a training procedure referred to as Data Based Gymnasium to acquire fundamental motor patterns and skills, as well as skills in the operation of wheel toys, aquatics, and leisure activities. If Data Based Gymnasium is to become more widely accepted, further replication of this procedure is necessary. Thus the purpose of this investigation was to replicate the training associated with Data Based Gymnasium in order to evaluate the efficacy of this instructional procedure. Two males enrolled in public school and educated in a self-contained classroom for the behaviorally impaired served as subjects. Each was classified as autistic by medical and educational personnel. Systematic observations of the subjects, engaged in specific motor patterns and skills during an adapted physical education instructional period, were completed to serve as a pre-intervention baseline. The behaviors under study for subject 1 were: continuous bounce, sidearm strike, catching, and overhand throw. For subject 2 the behaviors under study were operation of a tricycle, pulling a pull toy, and kicking a stationary ball. Data Based Gymnasium was implemented following the baseline phase according to the procedures reported by Dunn et al (1986). A graduate student who had been specifically trained in the procedures of Data Based Gymnasium implemented the training. A multiple baseline design was utilized to discern the influence of Data Based Gymnasium on the motor patterns and skills under study. Based on visual inspection of plotted data points, Data Based Gymnasium facilitated acquisition of the motor patterns and skills under study. At the termination of training S_1 had demonstrated mastery of the overhand throw, side-arm strike and catch patterns and had acquired greater than 90% of the task analyzed steps of the bounce pattern. Subject 2 acquired all task analyzed steps in kicking a stationary ball and greater than 80% of the steps in pulling a pull toy and riding a tricycle.

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Friday, April 17
10:45-12:00 noon

THE EFFECTS OF PHYSICAL FITNESS ACTIVITY ON MALADAPTED BEHAVIORS AND PHYSICAL FITNESS OF INSTITUTIONALIZED, MENTALLY RETARDED/ EMOTIONALLY DISTURBED ADULTS. Clarice Sue Combs, University of North Carolina at Wilmington.

The purpose of this study was to examine the effects of physical fitness training on maladapted behaviors and physical fitness of institutionalized, mentally retarded and emotionally disturbed adults. The subjects were five mentally retarded, emotionally disturbed individuals, who displayed a high frequency of maladapted behaviors. An equivalent time-sample design was used to show causal relationship between systematic physical fitness training and both maladapted behavior and the level of fitness of each subject. Maladapted behavior data were collected for one hour after fitness training would have occurred or did occur. These data were collected for two-one week base-line phases, two-three week intervention phases, and four follow-up sessions. Fitness data were collected pre-post, pre-post over a seven week period. Follow-up fitness data were collected two weeks after intervention was discontinued. Data analysis involved graphic inspection of the subjects' maladapted behaviors across phases and raw fitness scores across probes. A second process of data analysis involved subjecting the data to a two-way analysis of variance (ANOVA) yielding F values of the group across these research phases and probes. A confidence level was set at .01. Significance was established for maladapted behavior change between the baseline and intervention phases but not the retention phase. Significance was evident among progressive fitness probes including the retention data. Daily intervention consisted of specifically programmed physical fitness activities which included stretching activities, muscular endurance activities, and cardiovascular activities. Regular reliability checks yielded a 95 percent agreement for observed presence of targeted behavior. Also, a Likert-related questionnaire was used to establish strong social validity. Within the limitations of this study, the following conclusions can be drawn for these mentally retarded and emotionally disturbed adults: 1. Daily physical fitness activity did have a significant effect on the frequency of collateral maladapted behavior for one hour post exercise. 2. Daily exercise did have a significant effect on the level of physical fitness, specifically: daily stretching did have an effect on flexibility, participation in muscular endurance activities did have an effect on muscular endurance, and stationary bicycle and running/walking did have an effect on cardiovascular endurance.

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Friday, April 17
10:45-12:00 noon

COMPETENCIES FOR AN ADAPTED PHYSICAL EDUCATION SPECIALIST

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The purpose of this study was to compare college and university professors with adapted physical education specialists in their perception of the importance of a specified set of professional competencies. A mail survey, the Competencies for an Adapted Physical Education Specialist questionnaire utilized in this study was adapted from the Guidelines for Adapted Physical Education. The questionnaire contained 59 competency statements arranged in 20 categories and seven demographic questions. The study's population utilized two groups of adapted physical educators from the United States. One group consisted of college and university professors who have made significant contributions to the area of physical education for the handicapped. To be selected for this group, the professors had to meet a specified set of criteria. Sixty professors met this criteria. The second group, the adapted physical education specialists, were selected from the National Directory of Adapted Physical Education Personnel. A systematic sample yielded 274 adapted physical education specialists. Surveys were sent to the 60 professors and 274 specialists. The professors returned 56 (93%) surveys and the specialists returned 182 (66%). All data were collected in a seven week period. It was hypothesized that there is no significant difference in the perception of the college and university professors and specialists in adapted physical education regarding a specified set of professional competencies. The Chi-square statistic was used to treat the data. A .05 level of significance was chosen for this study. Phi and Cramer's V tests were utilized to determine the degree of association between the professors and specialists. Means and standard deviations were computed for the competency statements. The null hypothesis was rejected on 20 of the 59 (34%) of the statements. However, the mean ratings of the professors and specialists clearly indicate agreement in their perception of a specified set of adapted physical educator competencies. The professors rated 90 percent of the competencies as important or somewhat important ($\bar{X}$ range 1.00 to 1.75) and the specialists rated 92 percent of the competencies as important or somewhat important ($\bar{X}$ range of 1.00 to 1.75). The high level of agreement between the professors and specialists helps verify the Guidelines for Adapted Physical Education as a valuable guide for the preparation of adapted physical education specialists.

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Friday, April 17
10:45-12:00 noon

PHYSICAL WORK CAPACITY OF ADOLESCENTS WITH MILD IDIOPATHIC SCOLIOSIS.

Patrick J. DiRocco, University of Maryland; Paul Vaccaro, University of Maryland.

The purpose of this study was to measure the functional work capacity of adolescent idiopathic scoliotic patients to determine if cardiopulmonary restrictions begin to occur in the early stages of the condition. Nineteen adolescents (4 males, 15 females) between the ages of 10-17 years ($\bar{X} = 13.4$) who all have idiopathic thoracic scoliosis served as subjects. The mean scoliotic curve was 21.5°. Each subject had their height, weight, and percent body fat (Lange caliper) recorded. Resting vital capacity (VC) and forced expiratory volume (FEV$_1$) were evaluated using standardized clinical spirometry techniques. Work capacity was measured via a continuous graded incremental exercise tolerance test, employing a treadmill. A running protocol was utilized. Heart rate (HR) was continuously monitored by an electrocardiogram and a Beckman Metabolic Cart analyzed ventilation (VE), breathing rate (f) and oxygen uptake ($\dot{V}O_2$) every minute. Twelve of the subjects had VC measures that were one or more standard deviations below normal and also had $\dot{V}O_2$ max scores below 40 ml/kg/min. Subjects with curves of 25° or higher had a mean $\dot{V}O_2$ max of 32.6 ml/kg/min, while subjects with curves less than 25° had a mean $\dot{V}O_2$ max of 42.6 ml/kg/min. It appears that some pulmonary restrictions are beginning even in mild curves. Curves greater than 25° also appear to affect work capacity.

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Friday, April 17
10:45-12:00 noon

Aerobic Exercise Prescription for Rheumatoid Arthritics.
Blanche W. Evans and Hilda L. Williams, Drake University,
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The use of exercise as a general treatment for rheumatoid arthritics (RA) has included range of motion, muscular strength, water exercise and rest therapy while virtually ignoring possible benefits of aerobic exercise. The purposes of this project were to examine the guidelines for exercise prescription in relation to this special population and to determine the effects of a progressive, interval-type cycling program on physiological variables as well as perceived lifestyle changes in a small sample of RA. An additional purpose was to determine the ability of RA to withstand the rigors of a systematic aerobic exercise program. Measures of physical work capacity (PWC), ratings of perceived exertion (RPE), blood pressure (BP), and flexibility were completed in a small sample (n=4) of RA prior to and at completion of the exercise program. In addition, questionnaires concerning medical history and lifestyle were completed. The exercise program included 13 weeks of interval-type cycling on a Monark cycle ergometer. Subjects exercised three days each week for 30 minutes, alternating high intensity cycling (five minutes at 75% PWC) with low intensity cycling (five minutes at 25% PWC). Exercise intensity was prescribed as a percentage of initial PWC and by RPE. Exercise prescription by heart rate was not possible as subjects were physically unable, due to fatigue and pain, to perform work that would elevate heart rate to a 60% to 75% max level. Workloads were adjusted every two weeks throughout the program and no adverse effects were noted as a result of the progressive resistance exercise. Results of the study indicate that subjects improved PWC max by 10%, cycle test time by 74%, HR at max pain by 22% (114 to 130), and work (kpm) at max pain by 97.8%. In addition, BP decreased substantially during work and RPE was lower at posttest compared to pretest values. Changes in flexibility at the hip, knee and ankle were minimal. Lifestyle benefits included a reduction in fatigue, less pain throughout the day, and a reduction in daily pain medication. In conclusion, the results from this small sample of RA suggests the possible benefits of land cycling for RA and the ability of this group of individuals to withstand the rigors of such a program. However, some additional questions regarding appropriate exercise testing and prescription for RA indicate the need for further research. It is important to continue to examine current exercise guidelines with special populations to ensure a safe and progressive exercise program that provides the needed benefits to its participants.

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Friday, April 17
10:45-12:00 noon

KINETIC COMPARISON OF STATIC BALANCE PERFORMANCE OF NONHANDICAPPED AND LEARNING DISABLED MALE CHILDREN.

Sherry L. Folsom-Meek, Western Michigan University.

Reports in the research literature are conflicting in regard to static balance performance of learning disabled children when compared to nonhandicapped subject groups. Some investigators reported that normal subjects perform better than learning disabled subjects in balance tasks (Bruininks & Bruininks, 1977; Cinelli & DePaepe, 1984; Orfitelli, 1977), whereas other investigators reported no significant differences between the two groups (Kendrick & Hanten, 1980; Morerod, 1982, Schneider, 1981). The purpose of this study was to provide an indepth investigation of center of pressure displacement in the medial-lateral plane during static balance performance of two groups of children. Subjects were nonhandicapped ($n = 20$) and learning disabled ($n = 20$) male children between the ages of 8 and 11 years. Both groups were equivalent with respect to age. No subjects displayed any known physical impairments or orthoptic vision problems. Data were collected at the Center for the Study of Human Performance at Texas Woman's University. Subjects were administered five static balance tests from the Bruininks-Oseretsky Test of Motor Proficiency and the Lincoln-Oseretsky Motor Development Scale. Displacement in the medial-lateral plane was measured by a forceplate and charge amplifier interfaced with an Apple IIe microcomputer. Center of pressure was calculated from a neutral starting point relative to the center of the forceplate at a rate of 100 samples per second. Average displacement from the initial center of pressure point throughout a 3 s time period and time-in-balance scores were determined for each subject by means of a computer program. Descriptive statistics were computed for each group on mean center of pressure displacement and time-in-balance scores. The nonhandicapped group displayed greater mean center of pressure displacement and higher time-in-balance scores than the learning disabled group. Mean center of pressure displacement was the dependent variable for each of the group comparisons. Based on the results of a multivariate *t*-test and univariate analyses, there were no significant differences between the two groups of children in overall static balance performance and in performance on the five static balance tests.

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Friday, April 17
10:45-12:00 noon

STATE AND TRAIT ANXIETY AND ATHLETIC PERFORMANCE OF VISUALLY IMPAIRED ATHELTES.

Ronald French, Texas Woman's University; James V. Mastro, Braille Sports Foundation; Thomas Montelione, Queens College, CUNY.

The anxiety level of athletes before, during, and after performance has been a major concern of coaches. The reason for this is that an abnormal level of anxiety could cause psychological and physiological changes that may foster difficulties in the motor performance of skills requiring coordination and decision making.

Two types of anxiety have been identified. State anxiety is a transitory emotional state that varies in intensity and fluctuates over time. In contrast, trait anxiety is relatively stable; it relates to an individual's disposition to perceive and respond with state reactions. Based on the state-trait theory, an athlete with high trait anxiety will perceive more situations as dangerous or threatening and will respond with disproportionately higher levels of state anxiety than an athlete with low trait anxiety.

There is very little information reported in the literature on the influence of anxiety on the athletic performance of visually impaired athletes. This population was selected because it has been suggested that visually impaired individuals generally demonstrate a higher level of anxiety than sighted individuals when performing motor skills.

The purpose of this study was to investigate the role of anxiety on the performance of visually impaired athletes. The subjects were 21 male, visually impaired athletes who participated in the 1985 Texas State Goalball Tournament.

The entire State-Trait Anxiety Test (Spielberger, Gorsuch, & Lushene, 1970) was administered to all athletes within 15 min prior to the first game. The state subscale was readministered within 5 min after the completion of the last game the athlete participated in during the tournament.

A One-Way ANOVA was used to determine differences between successful athletes (on 1st, 2nd, or 3rd place teams) and unsuccessful athletes (on 4th, 5th, or 6th place teams) in terms of trait anxiety. A second One-Way ANOVA was used to determine differences between those athletes who won their last game and those athletes who lost their last game in terms of their scores on second administration of the state anxiety subscale. No significant difference were found in either case. This is in contrast to reports in the literature on the relationship of trait and state anxiety of able-bodied athletes to performance.

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Friday, April 17
10:45-12:00 noon

THE DEVELOPMENT OF A GRADED EXERCISE TEST FOR THE SPINAL CORD INJURED.

Lawrence A. Golding, University of Nevada, Las Vegas; Michael Horvat, University of Georgia; Terri A. Beutel-Horvat, University of Georgia; Tim McConnell, University of Utah.

The purpose of the study was to develop a graded exercise protocol on the treadmill for lower limb disabled individuals using arm movements that are common to wheelchair subjects. Twenty-seven subjects with lower limb disabilities were assessed on an treadmill modified to accommodate a wheelchair. An experimental graded exercise test protocol was initiated at 2 mph and 0% grade and progressed each three mins. with an 2% increase in the grade while keeping the treadmill speed constant.

This test protocol was developed to begin with a low workload and to gradually increase the amount of work until peak values were attained. The test protocol was sensitive to varying levels of fitness enabling all subjects to complete at least three testing stages reflecting the ability to evaluate unfit individuals, while elite wheelchair athletes attained peak HR and $\dot{V}O_2$ values within 24 min. of the procedure.

The results of the data analysis indicated that the increase in work was gradual enough to be within a medical margin of safety for all subjects resulting in an increase of approximately 1 MET per stage. Further the analysis of $\dot{V}O_2$ and HR values demonstrated the familiar linear relationship associated with work. Based on the results of this invesigation, it was concluded that the test procedure was appropriate for evaluating unfit and elite wheelchair bound individuals.

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Friday, April 17
10:45-12:00 noon

MOTOR PROFICIENCY AND BRAIN BEHAVIOR RELATIONSHIPS IN HOSPITALIZED DEPRESSED ADOLESCENTS.

Joseph Gruber, Laurie Humphries, John Hall, and Richard Kryscio, University of Kentucky.

This investigation explores the belief that physical activity therapy has a neurological value as part of the total treatment of mental patients. Twenty-two adolescents hospitalized with depression were administered a battery of diagnostic tests. Relationships among the *Bruininks-Oseretsky Motor Proficiency* test (12 subtest scores) and the *Luria-Nebraska Neuropsychological Battery* (14 subtest scores) were examined. Both tests were individually administered to each patient by trained measurement specialists. All patients were non-medicated and on a neurotransmitter controlled diet for 48 hours prior to testing. The best subset of *Luria-Nebraska* variables that could explain a given *Bruininks-Oseretsky* variable (and vice-versa) was selected by a stepwise multiple regression procedure. Results indicate that certain forms of motor performance can be predicted from measures indicative of both structure and function of brain behavior. The multiple R^2's ranged from .86 to .06 with variance in balance, bilateral coordination and fine motor skills being predicted from the receptive speech, tactile, right hemisphere, left hemisphere, expressive speech, motor and rhythm measures of brain behavior. When explaining brain behavior from motor proficiency scores the R^2's ranged from .70 to .28 with intelligence and expressive speech being predicted from the gross motor composite, upper limb speed and dexterity, balance, and fine motor composite scores respectively.

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Friday, April 17
10:45-12:00 noon

SELF PERCEPTION AND MOTOR PERFORMANCE OF HEARING IMPAIRED BOYS AND GIRLS. Chris A. Hopper, Humboldt State University.

Relationships between self perception and motor performance were studied in hearing impaired boys and girls at the Washington State School for the deaf. The subjects, (N = 32), ranged in age from 9 to 15 years and consisted of profoundly hearing impaired students. Self perception was determined by the Harter Self Perception Scale, consisting of the sub domains of scholastic, social, athletic competence, physical appearance, behavioral conduct and global self worth. The motor performance variables consisted of a nine minute run, standing broad jump, shuttle run, stick balance, sit ups, sit and reach and ball catch. Canonical correlation analysis established the relationship between the variables and statistical significance was set at the .05 level. The results of the study can be summarized as follows: (1) The canonical correlation between self perception, motor performance and age was significant. (2) A redundancy index of 54% indicates a substantial relationship between the two sets of variables. (3) Intraset correlations between the canonical variates and the original variables explained the nature of the relationships which existed between the two sets of variables. The self perception variables contributed in the same direction and all had sizeable correlations. Self perception was characterized by the physical domain (.94) and the global domain (.90). The motor performance variables were characterized by the shuttle run (.77) and the sit up (-.71). It was concluded that there is a strong relationship between self perception and motor performance in hearing impaired boys and girls.

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Friday, April 17
10:45-12:00 noon

THE EFFECTS OF EDUCATIONAL KINESIOLOGY UPON THE STATIC BALANCE OF LEARNING DISABLED BOYS AND GIRLS. Guruchiter K. Khalsa, Chino Unified School District; Josie M. Sifft, California State Polytechnic University, Pomona.

The purpose of this study was to determine whether Educational Kinesiology integration movements and/or repatterning have an effect upon the static balance of learning disabled elementary students. Sixty elementary school students from the Chino Unified School District in California participated in the study. There was an equal number of boys and girls ranging in age from seven to eleven years. The parents of each child were informed about the testing procedures, and consented to their child's participation in the study prior to the beginning of the program. The subjects were matched on age and gender, and they were assigned to one of three groups: 1) Repatterned E-K, 2) The E-K movement group, or 3) the control group. Individuals in the repatterned E-K group participated in a special movement analysis session prior to the treatment program. The students in the repatterned and E-K movement groups utilized E-K exercises for five minute periods, twice a day, five days a week for six weeks. The control group was not involved with E-K at all. Static balance in all three groups was measured using the modified stork stand of Arnheim and Sinclair (1979) before and after the six-week program. The gain scores of the students were analyzed using a 2 x 3 (gender x group) analysis of variance. The results of the analysis indicated a significant difference at the .0001 level between the three groups. Out of a possible 40 seconds, the groups showed the following improvements: Control = .34 (s=2.47), E-K movement = 4.91 (s=2.37), and Repatterned = 7.62 (s=4.88) seconds, respectively. A Scheffe post hoc analysis indicated that the results of the groups were significantly different from one another. The repatterned group showed a greater improvement in static balance than the E-K movement group, who in turn showed a greater improvement in balance than the control group. There was no significant difference between the improvement of the boys and girls, or in the interaction effect between gender and group. The results of this study support the notion that Educational Kinesiology is an effective treatment program to improve static balance of the learning disabled child. The results also suggest that E-K exercises are effective in themselves for improving balance, but that repatterning before the treatment program provides an even greater level of improvement than the movements alone. Finally, the results indicate that E-K can be used efffectively in a coeducational setting.

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Friday, April 17
10:45-12:00 noon

THE INTEGRATION OF AUTISTIC CHILDREN INTO A SPORT SPECIFIC SETTING. March L. Krotee and Stuart J. Schleien; University of Minnesota.

Despite various legal means such as Public Law 94-142, special populations such as the severely handicapped, mentally retarded, physically disabled and children with learning disabilities are still not fully or effectively integrated into our school, community and recreational settings in a systematic and regular basis molded in the spirit of the principle of the least restrictive environment. The purpose of the study was to investigate the psychosocial behavior patterns of severely handicapped autistic children integrated into a physical activity milieu and to determine if there were significant changes in the subjects' social, leisure and adaptive behavior skills and to provide requisite data for prudent integrative action. Attitude toward the severely handicapped S's by their nonhandicapped peers was also assessed to determine if significant changes were manifested. The subjects were two severely handicapped autistic children, ages 8 and 11 who measured S^1=124 and S^2=151 respectively in TARC skill assessment and sixty-seven nonhandicapped children. Each subject was observed by a trained observer employing the Social Interaction Observation System (Voeltz, 1981) which assessed the subjects' social and affect skills, attitudes towards peers and objects, as well as appropriate and target or inappropriate play behavior patterns. A single subject research paradign was employed and appropriate t-tests were applied to the data. The results of the study revealed that there were positive and significant differences in the amount of appropriate and inappropriate behavior pre and post physical activity treatment. Other psychosocial variables were also found to positively correlate to preferred patterns of activity. Attitudes toward the handicapped S's by their nonhandicapped peers were also found to yield positive results.

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Friday, April 17
10:45-12:00 noon

FORTY YEARS OF HEAD AND CERVICAL SPINE FATALITIES IN FOOTBALL 1945-1984.

Frederick O. Mueller, University of North Carolina at Chapel Hill.

Football head and cervical spine fatalities reached epidemic proportions in the late 1960's. The purpose of this research was to investigate the etiology of football head and cervical spine fatalities that have occurred in the United States since 1945 and to use this data to help reduce football fatalities. Upon establishing the incidence and etiology of head and cervical spine fatalities from 1945-1984, the data was analyzed by decade and concentrated on the variables that have either increased or decreased these fatalities. Data was collected on a national level from all organized football programs - public schools, colleges, professional and youth programs - through telephone contact and a questionnaire follow-up sent directly to the player's coach and physician. Information collected included demographic data, equipment data, injury type and body part, and pertinent information on the exact circumstances of the accident. Chi square analysis ($p < .05$) was used to demonstrate significant increase or decrease in fatalities between the decades. Football head and cervical spine fatalities were related to 84.6 percent of all football fatalities from 1945-1984. Chi square analysis indicated a significant ($p < .05$) increase in both head and cervical spine fatalities between the decades 1955 through 1964 and 1965 through 1974 and a significant decrease between the latter period and the decade 1975-1984. Major preventive measures given credit for the reduction of these fatalities have been the 1976 rules changes, the NOCSAE helmet standard, improved medical care and improved coaching technique. The data also reveal that the majority of the fatalities are related to high school football players either tackling or being tackled in a game. If tackling, the player was making contact with the top of his head. The research was supported by the American Football Coaches Association, the National Collegiate Athletic Association, and the National Federation of State High School Associations.

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Friday, April 17
10:45-12:00 noon

CONTEXTUAL INTERFERENCE EFFECTS ON THE TRANSFER AND RETENTION OF A GROSS MOTOR SKILL BY MILDLY MENTALLY HANDICAPPED CHILDREN.

David L. Porretta, East Carolina University, Greenville, NC

The purpose of this study was to investigate the effects of contextual interference on the immediate transfer and two-day retention of a bean bag tossing task by mildly mentally handicapped children. Forty-eight subjects (mean chronological age, 10.2 years) were randomly assigned to either a blocked, serial, or random practice condition. All subjects practiced tossing weighted bean bags of 85, 128, 142, and 184 g for 12 blocks of four trials each. Subjects in the blocked condition experienced each of the four weights for 12 consecutive trials and weights were counterbalanced across subjects. Subjects in the random condition randomly switched weights from trial to trial with no weight being repeated successively, while subjects in the serial condition practiced weights in the order of 85, 128, 142, and 184 g for each of the 12 trial-blocks. While seated and with the nonpreferred arm, blindfolded subjects tossed bean bags in an underarm manner to a floor target from a distance of 220 cm. Following each toss, subjects were allowed to view the results. Subjects were immediately transferred to a noval weighted bean bag of either 57 or 198 g for four trials following practice. Two days later, subjects tossed the same weighted bean bag again for four trials. During both transfer and retention trials, subjects were not allowed to view the results of the tosses. Absolute error (AE) was analyzed in three separate ANOVAs for practice, transfer, and retention data. The practice data analysis revealed that all subjects significantly reduced error ($p < .05$) over trial-blocks, and subjects in the blocked condition performed with significantly less error ($p < .05$) than subjects in the remaining two conditions. Both transfer and retention analyses showed that subjects in the random condition exhibited less error than subjects in the serial condition, and that subjects in the serial condition exhibited less error than subjects in the blocked condition. However, these differences were not significant ($p > .05$). Boys performed with significantly less error ($p < .05$) than girls on both transfer and retention, while regardless of gender, the heavier weighted bean bag resulted in significantly less error ($p < .05$) on transfer only. Results from this study provide only marginal support for Battig's (1979) contention that greater contextual interference (random practice) leads to better transfer and retention. Therefore, Battig's notions should be interpreted with caution when addressing transfer and retention of gross motor skills by mildly mentally handicapped children.

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Friday, April 17
10:45-12:00 noon

THE INFLUENCE OF FLEXIBILITY TRAINING ON ENHANCING SPINAL MOBILITY IN OLDER ADULTS.

Robert A. Rider and Janice Daly, Florida State University.

The purpose of this investigation was to determine the effects of a planned program of flexibility exercises on spinal mobility in older adults. Spinal mobility is measured in terms of back flexion and extension, or total range of motion between the hip and neck. Subjects assigned to the experimental group (6 female, 1 male, Mage 74.2 yrs.) participated in an 8 week exercise program which contained a specialized flexibility training component addressing both spinal flexion and extension. Subjects assigned to the control group(7 female, 1 male, Mage 69.4 yrs.) participated in a separate exercise program without the flexibility component. Both groups were pre-tested at the beginning of the program on spinal flexion, spinal extension(feet anchored) and spinal extension(feet free). The prescribed exercises administered to the experimental group(3 times per week for 8 weeks) were selected for their suitability for enhancing spinal mobility as recommended by physicians and physical therapists. At the end of the 8 week period, all subjects were post-tested and evaluated for changes in spinal mobility. An ANOVA with repeated measures revealed significant ($p < .01$) interactions between groups for all measures, with the experimental group evidencing the greater degree of improvement. A Neuman-Keuls Post Hoc Test determined that this improvement was significant when comparing the experimental group's progress to that of the control group. In addition, the pre-test to post-test gains for the experimental group were also found to be statistically significant from the post hoc analysis. The control group's spinal mobility remained basically the same throughout the study. The results of this investigation support the inclusion of a prescribed flexibility training component in exercise programs designed for the older adult population. The improvement manifested in the experimental group indicates that age alone should not inhibit the enhancement of spinal mobility in the later years. The implications of this investigation are that restrictions in spinal mobility may be lessened through specialized flexibility training and may additionally, under the supervision of a physician, aid in the management of spinal condiditions such as osteoporosis and kyphosis.

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Friday, April 17
10:45-12:00 noon

SELF-ACTUALIZATION PROFILES OF ABLEBODIED AND CEREBRAL PALSIED FEMALE ATHLETES.

Claudine Sherrill, Wanda Rainbolt, Texas Woman's University.

The purpose of this study was to extend the self-actualization research on ablebodied female athletes (Gunderson, 1982; Ibrahim & Morrison, 1976; Schmitt, 1973) to cerebral palsied (CP) female athletes. Specifically the self-actualization profile pattern of CP female athletes (N=23) was examined in relation to that of the normal adult population in Shostrom's test manual (1976) and to profiles of four samples of female athletes (n=51, 50, 33, 25, respectively). The cerebral palsied sample included 85% of the female population which had competed internationally during the past 3 years; the age range was 17 to 43, M=27.70. The Personal Orientation Inventory (POI) of Shostrom (1963) was used as the measure of self-actualization. Mean responses of each sample to this 150-item instrument were converted to standard scores by plotting POI profiles which depicted functioning on 12 personality dimensions. The results indicated that all female athlete samples had profile patterns in which the 12 measures fell between the 40 to 60 standard score lines (i.e., were normal rather than high or low in self-actualization). On the overall self-actualizing measure, three samples (including the CPs) were identical to the normal adult population and two were slightly above it. On feeling reactivity, spontaneity, and self-regard, three samples (including the CPs) had profile patterns better than that of the normal adult population. The lowest profile points of all samples were existentiality and self-acceptance. It was concluded that female athletes, including CPs have normal rather than high or low self-actualization profiles.

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Friday, April 17
10:45-12:00 noon

GAIT ANALYSES OF THE WALK AND RUN OF ATHLETES WITH CEREBRAL PALSY: A KINEMATIC APPROACH.

V. Dianne Ulibarri, Gail M. Dummer, Sharon A. Evans, Michigan State University.

The purpose of this study was to investigate kinematic and temporal characteristics of one Class VII and one Class VIII athlete with cerebral palsy who competed in the 1985 National Cerebral Palsy/Les Autres Games. Two LOCAM cameras operating at 100 Hz were orthogonally positioned in the sagittal and frontal planes. Data reductions were performed using a Van Guard Motion Analyzer to project film images onto a screen surface. A full stride (left to left) was digitized for each subject. Data were smoothed using the First Central (Taylor Expansion Series) procedure.

Displacements, velocities, and temporal components for each gait were obtained using KINEMAT, a biomechanical software program. In addition, hip-knee and knee-ankle angle-angle diagrams (Hershler & Milner, 1980) were plotted to measure the areas as well as to display the shapes of each graphed loop. Differences between the gait characteristics of the two athletes were also analyzed using ANOVA procedures at a 0.05 level of significance. For the kinematic variables examined, significant differences were found to exist in displacement and temporal components of both walking and running. The Class VIII runner had greater stride length and velocity than the Class VII athlete.

Differences in the areas (perimeter/$\sqrt{\text{area}}$) of angle-angle diagram loops were more striking than the differences in kinematic variables. Angle-angle diagrams permit data to be presented in a clinically acceptable format, display characteristic differences associated with various gait speeds, and convey information about range of motion during each gait cycle. The results of this study indicate that the areas of the angle-angle loops for the Class VIII athlete were greater and smoother than those for the Class VII athlete. These results have implications for classification of athletes for competition and for therapeutic interventions designed to improve gait patterns.

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Friday, April 17
10:45-12:00 noon

EFFECT OF THE PERFORMANCE OF AN INCIDENTAL TASK ON THE SUBSEQUENT LEARNING OF AN INTENTIONAL MOTOR RESPONSE IN NONRETARDED AND MODERATELY MENTALLY HANDICAPPED ADULTS.

Jeanne Zeller Wenos, Western Washington University.

The purpose of the study was to compare response levels of moderately mentally handicapped (MOMH) and nonretarded adults on a hand-eye task that was learned either by intentional means alone, or combined with the incidental performance of a task to orient one to the apparatus. Male and female adults (N-64), ages 18 to 35, served as subjects in the study; half were MOMH and half were nonretarded. The pursuit rotor was selected as the testing apparatus because of the established reliability of its use in the literature, and its adaptability as a task of anticipation-timing. The subjects were randomly assigned to one of eight treatment groups on the basis of gender and intelligence, and were tested individually for three consecutive days, 50 trials per day. Those assigned to a control group (4 groups) tracked a triangular pattern on the pursuit rotor in a clockwise (CW) direction at 30 rpm. Those assigned to an experimental group (4 groups) performed the orienting task in place of one session of tracking practice. Opaque tape placed on the triangular pattern allowed visibility of the light beam but prevented the clock from being activated when the stylus and light beam were in contact. The subjects moved the stylus in a CW direction about the triangle while the light beam simultaneously traveled in a counter CW direction at 30 rpm. The objective was to anticipate the light beam at a target point, 3.81 cm wide, by moving the stylus across the target coincidentally with the light beam. The incidental task was designed to provide orientation to the pursuit rotor in terms of speed and directional changes. The results of a four-way ANOVA (treatment x gender x intelligence x days) yielded significant main effects for gender, in favor of males; and intelligence, in favor of nonretarded adults. The main effect, treatment, was nonsignificant on days 2 and 3 of training, indicating that the incidental task provided sufficient orientation to allow subjects to learn to track at a level that was not significantly different from those who had trained specifically for the task over three days. A post hoc power analysis for the effect, treatment, yielded a coefficient of .72, thus it was concluded that sufficient power was available to accept these results on the basis of a nonsignificant statistic. Intraclass reliability quotients for the measure of the dependent variable ranged from .92 to .99 for all groups.

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Friday, April 17
10:45-12:00 noon

PREDICTING ADOLESCENT BLOOD PRESSURE OVER A FOUR YEAR PERIOD.

O. Matthew Adeyanju, University of Kansas; William H. Creswell, University of Illinois.

The study was set up to potentially determine if a stepwise multiple regression model composed of such factors as socio-demographic, attitudes, behaviors in combination with selected biomedical measures can be used to predict adolescent at risk health condition such as hypertension. The study population consisted of 686 ninth grade students in the baseline survey (1981) and 606 twelveth grade students in the final survey of 1985. Data collected included clinical measures of height, weight, triceps skinfold thickness, blood pressure, Body Mass Index (BMI), resting pulse, and Percent Ideal Body Weight (PIBW). Self reported health behaviors, attitudes, and socio-demographic variables were also assessed. The baseline ages were 14-16 years. Principal factor analysis with varimax rotation was employed to determine the grouping of the behavioral/attitudinal test items. This thereby permitted a reduction of the variables from 52 behavior/attitude test items to 20. Furthermore, in an effort to increase the accuracy of prediction, those behavior and attitude items that came out very significant in their factors loadings plus other socio-demographic and clinical measures were entered into the stepwise multiple regression model. The regression analysis was used to determine the variables' potentials as predictors of blood pressure in adolescents. Significant potential predictors of male diastolic blood pressure included smoking, alcohol intake habits, obesity, pulse, race, age and parents' socio-economic status; while predictors for the females focussed on smoking, alcohol intake habits, stress, obesity, pulse and race. Potential indicators for male systolic blood pressure were smoking, alcohol habits, weight, height, race, parent's socio-economic status; while smoking, alcohol habits, stress, obesity, pulse and race for the females. Investigations such as this study analysis on adolescent blood pressure can contribute immensely to our knowledge of the etiology and prevention of chronic conditions before its harmful sequelae do occur. It is very pertinent to be aware that blood pressure studies in children/adolescents are the only way to obtain scientific/analytical evidence on the multifactorial determinants of blood pressure elevation and on the ways to control or modify there myriads of factors. Community health promotion, prevention, and educational programs directed at these potential predictors need to be implemented to encourage healthful lifestyles in the younger generation.

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Friday, April 17
1:00-2:15 p.m.

Title: Correlates of Smokeless Tobacco Usage by College Athletes

Purpose: The purpose of this study was to determine the correlates and predictors of smokeless tobacco (SLT) by women and men athletes in team sports at a major midwestern university. There is a paucity of information about usage of SLT by college athletes and the utility of these findings are important for designing health promotion programs.

Methods: The sample consisted of women and men athletes on eleven team sports. During March, 1986, 242 athletes (29.8% female and 70.2% male) were administered a self-report questionnaire on tobacco usage, peer usage, and attitudes toward smokeless tobacco. Cronbach's alpha for the scales ranged from .73 to .86 indicating acceptable reliability. Chi-Square was used to compare males/females on use/non-use of SLT. Stepwise multiple regression and discriminate analyses were used to examine correlates and predictor variables.

Results: The usage of chewing tobacco and snuff were significantly higher for male athletes (Chi-Square = 46.5 for snuff and 20.2 for chewing tobacco). Approximately 20.0% of males were regular/occasional users of snuff while 10.5% were users of chewing tobacco. Team sports most likely to use SLT were baseball (50% users), football (44% users), and wrestling (35% users). The best predictors of SLT usage were peer usage, and beliefs that SLT is not a health problem and socially OK to use. These variables accounted for 34.4% of the variance. Discriminate analysis correctly classified 85% of the users of SLT.

Conclusion: The findings suggest that health promotion activities on the usage of SLT should concentrate on male athletes. Educational efforts ought to address resistance to peer pressure and the health risks associated with usage.

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Friday, April 17
1:00-2:15 p.m.

SELECTED FACTORS AFFECTING DRIVER EDUCATION IN PUBLIC SCHOOLS: A NATIONAL STUDY.

James W. Crowe, Indiana University; Mohammad R. Torabi, Indiana University

The role of driver education as a public school subject is being challenged in many states across the country. Driver education is a program designed to develop safer, more effective, and more efficient motor vehicle drivers that are capable of using the highway transportation system in a safe and effective manner. However, due to legislative mandates in many states, funding for driver education programs in public schools has been decreased or eliminated; therefore, the offering of driver education in public schools has decreased. In order to determine the status of driver education programs in all fifty states, a questionnaire was constructed to assess four areas of concern in public school driver education programs. The questions addressed the issues of funding, licensing, certification requirements, and commercial schools. The questionnaire was devised and sent to all 50 state directors of driver education. A return rate of 96 percent was achieved. The collected data were subjected to a statistical analyses and the related hypotheses were tested by using non-parametric tests. The trend of enrollments clearly suggests a decrease in most states. The study found that fewer than half of the states provided supplemental financial support for driver education. The data reveal that most states allow students to obtain a drivers license at age 16 after having completed a minimum of 30 hours of classroom and 6 hours of behind-the-wheel instruction. Commercial schools were generally judged to be of poorer quality compared to public school programs. This judgment was based on lack of certified instructors and less rigorous demands placed upon the student driver. It was concluded that there are many problems that need to be resolved in the area of driver education. An immediate concern is the need for supplemental financial funding in order to make the program available in the public schools to all students of licensing age.

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Friday, April 17
1:00-2:15 p.m.

USE AND KNOWLEDGE OF COMMUNITY HEALTH SERVICES AMONG HOME-CENTERED AND ACTIVE ELDERLY.

Evalyn K. Flatten, Iowa State University; Keryl L. Keller, Iowa State University; Barbara A. Wilhite, Southern Illinois University.

Community health services designed for frail elderly include delivered and congregate meals, visiting health-aids and nurses, adult daycare, and telephone and postal checks. It is often assumed that all elderly persons know of these services, but only the most needy actually use them. This assumption was tested on two groups of elderly (home-centered and active) from three Iowa communities. In-home interviews were conducted on 168 subjects who were selected from either a home-centered or active older population and grouped accordingly. Subjects were asked if they had ever heard of seven specific services available in their communities. If subjects had heard of a service, they were asked if they had used that service. Frequencies of response were run on the knowledge of all seven services, noting the percent of home-centered and active aware of each service. This procedure was repeated for utilization of these same services. Chi-square tests of independence were run to detect differences between the home-centered and active elderly. No difference was found at an alpha of .01 between home-centered and active elderly in their knowledge of visiting nurses, meals on wheels, and homemaker health-aids. In addition, both groups were well informed of these medical and nutritional programs. However, home-centered elderly used these same services significantly more than the active elderly. All of the active and 93% of the home-centered elderly had heard of congregate meals. Even though this difference was significant, there was substantial awareness in both groups. Congregate meals was the one service used frequently by active elderly. This use did not differ significantly for the home-centered. In both groups, approximately 50% of the people who had heard of congregate meals used them. Fewer subjects had heard of telephone reassurance, adult day care and carrier alert. Of those who had, the home-centered were less informed than the active. This difference was significant for telephone reassurance and adult daycare. The small number aware of carrier alert made significance difficult to detect. It appears that a desirable pattern is present in the knowledge and use of nutritional and medical services for the elderly. Most subjects in this study, regardless of the level of frailty, were aware of these services and, furthermore, only the most needy were using them.

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Friday, April 17
1:00-2:15 p.m.

RESPIRATORY AND CARDIAC RESUSCITATION SKILLS OF THE HIGH SCHOOL ATHLETIC COACH. Steven R. Furney, Southwest Texas State University.

The purpose of the study was to examine high school athletic coaches with regard to respiratory and cardiac emergency procedures. It sought to determine how important athletic coaches felt cardiopulmonary resuscitation and the Heimlich maneuver were to their jobs, how proficient they were at the skills, and how frequently these life saving techniques had been used. The subjects for this study consisted of 1773 athletic coaches which were surveyed regarding cardiac and respiratory emergency procedures. Questions the coaches were asked included: how many know CPR and the Heimlich maneuver (based on American Heart Association or American Red Cross certification), has anyone had to use either of these procedures for a respiratory or cardiac emergency, does the school district offer in-service training for CPR or the Heimlich maneuver, how important is the knowledge of these skills to their job, and would the subject participate in continuing education training sessions if made available. The results of this study indicated that at least 50% of the coaches surveyed were proficient at both CPR and the Heimlich maneuver. It was also reported that in-service instruction for both skills was made readily available, however, this training was provided more often in larger school districts than in smaller ones. While subjects were very strong in support of continuing education on these skills, they were not so supportive when it came to their own participation in this training. Subjects were very much in agreement on the fact that knowledge of CPR and the Heimlich maneuver was important to their job and twenty-four subjects indicated that they had used the skills in emergency situations. While the results of this study deal with cardiac and respiratory emergency procedures, emphasis should be continued on proper training techniques for athletic coaches as well as other school personnel.

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Friday, April 17
1:00-2:15 p.m.

ARE MANDATORY SEATBELT LAWS EFFECTIVE IN PROMOTING SEATBELT USE?

R. N. Godsen, College of Charleston, Charleston, SC 24624.

Since the implementation of New York's Mandatory Seatbelt use law in January of 1985, more than sixteen states (MANUSE) have passed similar legislation. Typically, the success of such laws is determined by looking at a change in usage manifested by drivers and passengers in some defined sample. The problem with this approach is that the assumption is made that the change observed is a result of the law. A more respectable line of reasoning would be to compare MANUSE change with seatbelt behavior in a group of contiguous states without such laws (NOLAW). That was the purpose of this study. A group of fifteen eastern states (and D.C.) were selected because of their contiguity and the fact that pre-law data (PREDAT) had been collected there some two years ± two months prior. A second sample (POSDAT) was taken in the summer of 1986 at the same 166 locations following a similar time schedule. Because of adherence to data collection procedures and other uncontrollable factors (accidents, detours, etc.), the PREDAT and POSDAT sub-samples were not always the same size. It was necessary, therefore, to adjust POSDAT sub-sample size to a PREDAT base. In addition to correcting for the sub-sample size disparity, this approach also facilitated the analysis of changes via a simple 2 X 2 chi-square with four "on" cells. In all, more than 172,000 observations were included within the data analysis. It is clear from the table below that there has been a substantial increase in seatbelt use over the past two years for both groups. Although the MANUSE states show significantly greater use ($X^2 = 2051$, 1 df) and change ($X^2 = 41.7$, 1 df), the differences are not great as expected. This suggests that other factors are involved in increased seatbelt use, and they may be nearly as powerful as the threat of punishment. Are mandatory seatbelt laws effective in promoting seatbelt use? "Only moderately" is the reasonable answer. It is hard to accept the argument that such laws are highly effective when the majority of the travelling population is typically non-compliant.

GROUP	N	PERCENT USE 1984	PERCENT USE 1986	P
MANUSE*	90745	18.2	44.1	<0.01
NOLAW•	81706	15.4	31.3	

* D.C, FL, MA, MD, NC, NJ, NY, OH, TN
• AL, GA, KY, PA, SC, VA, WV

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Friday, April 17
1:00-2:15 p.m.

A PRELIMINARY ANALYSIS OF HEALTH RISK APPRAISAL DATA AND ONE YEAR RETROSPECTIVE MEDICAL CLAIMS.

Thomas Golaszewski and Donald Vickery, The Center for Corporate Health Promotion; Dee Edington and Louis Yen, University of Michigan.

The purpose of this research was to examine the relationship between HRA data and retrospective health insurange claims. During the Spring of 1986, HRAs and claims histories for 1985 were collected from 6,251 employees of the Travelers Insurance Co. Using a hierarchical multiple regression analysis, claim dollar totals were treated as the dependent variable with sex, age, education, and age difference (HRA appraised age minus actual age) as the independent variable. A modest, though significant, multiple correlation of .115 was observed with a significant partial correlation of -.026 for age difference. These results necessitated a further analysis of the data which revealed that ex-smokers and ex-drinkers distorted the expected relationship between the HRA and claims. Removing these individuals (n = 1,675) from the analysis resulted in a significant multiple correlation of .123 with the partial regression for age difference increasing to -.053. In conclusion, the results indicate that an expected relationship occurs between HRA output and claims; i.e., as age difference increases (suggesting a healthier profile), claim dollar amounts decrease. Furthermore,future research of this kind should increase the length of claims history analyzed, and carefully examine the makeup of the subject base to be included.

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Friday, April 17
1:00-2:15 p.m.

FACTOR ANALYSIS OF INTERNAL AND EXTERNAL SELF-CONTROL PRACTICES FOR ALCOHOL CONSUMPTION.

Dean R. Gorman, Ph.D., University of Arkansas; Chudley E. Werch, Ph.D., University of Arkansas.

The purpose of this study was to factor analyze responses indicating specific alcohol-related self-control practices reported by a sample of young adults. Research indentifying constellations of both internal and external self-control practices for alcohol consumption could lead to the development of conceptualizations as well as clinical interventions aimed at explaining how individuals attempt self-change. Four hundred and ten students enrolled at a southern university were randomly selected to participate. All subjects were mailed a Self-Control Questionnaire which included measures of external and internal self-control practices. Test-retest reliability for the internal and external self-control measures combined was high ($r = .96$, $p < .0001$). The external self-control measure had 37 items representing self-control coping behaviors, such as goal setting and self-monitoring. Subjects were asked to identify on four point scales (1 = never, 2 = seldom, 3 = sometimes, and 4 = often) how frequently they used specific strategies to deliberately limit their drinking or prevent excessive use of alcohol or unwanted consequences. The internal self-control measure had 14 items concerning internal sensations experienced while drinking. Subjects were asked to indicate the extent to which they were aware of each of the body sensations during drinking, on three point scales (1 = not aware, 2 = somewhat aware, and 3 = very aware). The data were analyzed using the Statistical Analysis System (SAS) program Factor procedure (Ray, 1982). The factors were rotated using the Varimax procedure. Seven factors were extracted in the analysis of the external self-control items, while three factors were generated in the analysis of the internal self-control items. The lack of overlap of the self-control items comprising each scale suggests that individual measures have considerable discriminative ability. The analysis of external self-control items produced the following factors: 1) Rate Control, 2) Self-Reinforcement and Punishment, 3) Alternatives, 4) Avoidance, 5) Limiting Driving and Cash, 6) Controlling Time and Food, and 7) Awareness. The analysis of the internal items produced these factors: 1) Impairment, 2) Relaxation, and 3) Anxiousness. This study suggests specific groupings of external and internal self-control variables which should be studied for their potential utility as interventions aimed at moderating alcohol consumption of young adults attending college.

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Friday, April 17
1:00-2:15 p.m.

HEALTH RISK BEHAVIOR TRENDS IN A COLLEGE BOUND POPULATION.

Rick Guyton, University of Arkansas; Phil Marty, University of Arkansas; Charles Mullins, University of Arkansas.

Numerous instruments have been designed to measure the health risks associated with specific lifestyle behaviors. One such instrument is the "Wellness Check", developed by the Rhode Island State Health Department. This instrument has been used to collect health information from the entering Freshman Class at the University of Arkansas for three consecutive years. The purpose of this study was to assess the health risk behaviors of three consecutive groups of entering freshmen to determine if there were significant trends occurring in the health risk profiles of college bound students. Data were analyzed by computing percentages and chi-square correlations. Results indicated significant differences in eight of the twelve risk factors measured ($p = .05$). A significant chi-square indicated that there were changes by year not attributable to chance when comparing 1984, 1985, and 1986, entering freshmen at the University of Arkansas. Significant differences occurred in percentages of students who were overweight, exercised aerobically 3 times weekly, drank more than 10 alcoholic drinks per week, seldom used seatbelts, occassionally drove under the influence of alcohol, had lifestyles characterized by three or more stress related risk factors, had not been immunized properly, and for women who had not had a pap test within 2 years. No significant differences resulted in the groups when comparing nutrition habits, cigarette usage, blood pressure analysis, and breast self examination for women. Results from this study indicated that program activities designed to influence the health risk behaviors of young people are perhaps having a behavioral impact in several key areas, but significant trends have not occurred in this entering college population regarding smoking behaviors, nutritional habits and blood pressure monitoring, all critical behaviors that impact longevity and morbidity statistics.

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Friday, April 17
1:00-2:15 p.m.

THE INFLUENCE OF THE TEENAGE HEALTH TEACHING MODULES ON THE KNOWLEDGE, ATTITUDES, AND PRACTICES OF ADOLESCENTS. Betty M. Hubbard, University of Central Arkansas; Michael E. Young, University of Arkansas.

The primary purpose of this study was to determine whether participation in a comprehensive, secondary health curriculum, namely the Teenage Health Teaching Modules (THTM), affected the health knowledge, attitudes, and practices of adolescents. A secondary purpose of the study was to determine to what extent "traditional" textbook instruction impacts secondary school students. All assessments were conducted on junior high and senior high students in selected Arkansas schools. Subjects were divided into three groups: two treatment groups and one control group. The treatment groups consisted of (a) classes that participated in the THTM curriculum and (b) classes that received textbook instruction. The control group was composed of classes that received no health education intervention. A 100-item questionnaire was utilized to measure health knowledge, attitudes, and self-reported practices. This instrument was administered to the three groups as a pretest and a posttest in order to elicit the data for the statistical analysis which tested the nine hypotheses of the study. Data were analyzed using "Proc GLM" to perform a randomized block analysis on mean difference scores for matched classes. Analysis of the results revealed significant differences between the experimental groups and the control group in the areas of knowledge and attitudes. That is, the THTM and textbook groups exhibited larger gains from pre to posttest than the control group. In the area of health practices, classes who received instruction in the THTM showed significant increase in positive health practices as compared to classes receiving no health instruction. No significant difference existed between the THTM and textbook group or the textbook and control group. The study provided evidence to indicate that health education intervention results in gains in health knowledge and attitudes of secondary students. Additionally, adolescents exposed to the THTM showed positive change in self-reported health practices. It would seem that textbook health instruction accomplishes positive health outcomes and that exposure to the THTM yields even more positive results.

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Friday, April 17
1:00-2:15 p.m.

A SURVEY OF COLLEGE STUDENTS' ATTITUDES, BELIEFS, EXPERIENCES, AND INTENTIONS REGARDING BREASTFEEDING: ESTABLISHING A BASELINE FOR HEALTH PROMOTION AMONG TOMORROW'S PARENTS.

Susan J. Koch, University of Northern Iowa.

One of the Health Promotion-Disease Prevention objectives for the nation, as established by the Surgeon General of the United States, is that by the year 1990, 75% of new mothers will be breastfeeding at hospital discharge and 35% will still be breastfeeding after six months. Although the percentages have been increasing in recent years, only 54% of mothers in the U.S. even attempt breastfeeding and the decline after only a few weeks of the practice is enormous. Today's traditional age college students who were born between 1963 and 1968, represent the birth years when breastfeeding hit an all time low of 18% in the U.S. (1966). The purpose of this study was to describe selected attitudes, beliefs, experiences and intentions regarding breastfeeding within this group. Differences between males and females, breastfed and non-breastfed and parental levels of education were also explored. A 17-item self-report questionnaire was administered to a group of 126 male and 164 nulliparous female personal health students. The data were computer analyzed with the use of the Statistical Package for the Social Sciences (SPSS), frequencies were obtained and chi square analysis was utilized to test the three null hypotheses. A confidence interval of .05 was selected. Thirty percent of the 290 respondents indicated bottlefeeding was as healthful or more healthful than breastfeeding. Over 90% felt it was unacceptable anyplace outside of the home. Only six percent indicated a preference for exclusive breastfeeding of their own future children. Males were significantly less knowledgeable regarding the benefits of breastfeeding. The students who had been breastfed were significantly more knowledgeable about the practice and were likely to favor breastfeeding. The lack of knowledge many students demonstrated, plus other factors including current medical practices, societal taboos and increasing numbers of women who are employed during childbearing years may dramatically affect the percentage of women who successfully breastfeed in the next decade. This group is clearly at risk. Health education specialists and medical personnel who are associated with this age group can help to facilitate changes in attitudes and beliefs about breastfeeding by including discussions about it's advantages in personal health and family living courses. University students, particularly, need to know that breastfeeding and working is possible with appropriate planning & support.

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Friday, April 17
1:00-2:15 p.m.

THE INFLUENCE OF THE GROWING HEALTHY CURRICULUM ON SELECTED DRUG EDUCATION OBJECTIVES FOR FOURTH GRADERS.

Gary A. Lewers, University of Central Arkansas; Jane Lammers, University of Central Arkansas.

The purpose of the study was to determine the effect of the Growing Healthy curriculum at the fourth grade level on drug knowledge, self concept, and respect for one's body. Funding for the program and evaluation was provided by the Arkansas Office of Alcohol and Drug Abuse Prevention. Experimental and control groups in five school districts were surveyed with pre and post written cognitive and affective tests. The instruments included questionnaires from the _Drug & Alcohol Evaluation Handbook_ from the Centers for Disease Control and the _Piers-Harris Self-Concept Scale._ Differences between groups were analyzed by utilizing the t-test. All variables were measured at the .05 level of significance. Analysis of the results indicated that children in the experimental groups demonstrated a significant increase in drug information, a more positive self-concept, and the potential to engage in activities which are healthful. The results also indicated that spending of categorical monies can be justified for comprehensive school health education programs.

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Friday, April 17
1:00-2:15 p.m.

BODY WEIGHT AND BODY FAT INCREASES ASSOCIATED WITH CESSATION FROM CIGARETTE SMOKING.

Robert J. Moffatt, The Florida State University; Margaret Paquin, Western Washington University.

This study examined the effect of cessation from smoking on body weight, body fat, resting metabolic rate and caloric consumption. Twenty-six females aged 25-45 years ($\bar{x} = 37.2 \pm 4.7$) who smoked 20 or more cigarettes per day for the past five years served as volunteers. Twenty subjects abstained from smoking for a period of 60 days (EX-SMOKERS). Six stopped smoking for 30 days then resumed the habit for an additional 30 days (RE-SMOKERS). Eight subjects continued to smoke for the entire 60 days (SMOKERS). Additionally, 10 females who had never smoked served as non-smoking controls (NON-SMOKERS). Body weight was recorded weekly from a beam balance scale. Body fat was calculated from body density as determined by hydrostatic weighing. Resting metabolic rate (RMR) was assessed by open circuit spirometry. Caloric intake was obtained from daily food records using a computerized nutrient data base. Group means for body weight, body fat, RMR and caloric intake were compared using a repeated measures ANOVA with a Scheffé post hoc at day 0 (baseline), day 30 and day 60 of cessation from smoking. NON-SMOKERS weighed significantly ($P < 0.05$) more but were no fatter than all smoker groups at day 0. Body weight significantly increased by 2.5kg (EX-SMOKERS) and 1.6 kg (RE-SMOKERS) at day 30 of cessation. By day 60 EX-SMOKERS body weight had increased an additional 1.5 kg to 61.6 ± 6.4 kg while return to smoking (RE-SMOKERS) resulted in a 2.3 kg loss of body weight to 57.9 ± 7.9 kg. Body fat significantly increased from 28.4% to 30.6% by day 30 and further increased to 31.1% by day 60 for NON-SMOKERS. Body fat of RE-SMOKERS significantly increased from 28.1% to 31.7% by day 30 of cessation and remained at that level at day 60. Smoking cessation resulted in an eight percent decrease in caloric intake for EX-SMOKERS by day 30, with no further decrease occurring by day 60 of cessation. RE-SMOKERS demonstrated a similar decline by day 30 followed by a return to baseline levels by day 60. RMR was significantly reduced by 16% and 12% for EX-SMOKERS and RE-SMOKERS respectively at day 30. EX-SMOKERS showed no further change by day 60 while RE-SMOKERS' RMR returned to baseline levels. No significant differences were observed for body weight, body fat, RMR or caloric consumption for SMOKERS or NON-SMOKERS. Smoking cessation leads to increased body weight presumably by decreasing RMR while energy intake remains essentially unaltered. The resultant body weight gain is attributable to increased body fat.

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Friday, April 17
1:00-2:15 p.m.

A CONTROLLED STUDY OF THE IMPACT OF COURT MANDATED DUI EDUCATION

Samuel W. Monismith, Pennsylvania State University; Wesley F. Alles, Pennsylvania State University

This study examined the impact of a court mandated educational alcohol-highway safety course on the knowledge, attitudes, opinions, and behavioral intentions of fifty-six individuals who had been arrested for driving under the influence of alcohol. Subjects were randomly assigned to either an experimental or control group with the experimental group receiving the alcohol-highway safety education course. Both groups completed a pre-treatment and post-treatment questionnaire that assessed knowledge, attitudes, opinions and behavioral intentions concerning drinking and driving. Analysis of variance was used to determine if significant interactions existed among mean scores, and significant interactions were clarified with follow-up t-tests. In addition, for the experimental group, a six-week telephone follow-up on the behavioral intent portion of the questionnaire was administered. Findings from the study indicated that significant differences existed between the groups concerning knowledge, opinions, and behavioral intentions related to drinking and driving. Participation in the alcohol-highway safety education course by the experimental group produced positive gains in all three of these variables. The most substantial gain occurred in knowledge concerning the effects of alcohol and driving skills. No significant difference was found between the groups in relation to change in attitudes about drinking and driving, although both groups did move in a positive direction. Also, no significant decline occurred in the behavioral intent follow-up for the experimental group which suggests that intentions to engage in responsible drinking and driving practices do not diminish over a short period of time. Overall, participation in the alcohol-highway safety course had a very positive impact on the subjects who completed the course.

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Friday, April 17
1:00-2:15 p.m.

WOMEN'S HEALTH PRACTICES IN RELATIONSHIP TO MARITAL STATUS, EMPLOYMENT, OCCUPATION, EDUCATION AND AGE. Dianne B. O'Brien, Murray State University, Murray, Kentucky.

The primary purpose of this study was to investigate the relationship of marital status, number of people in household, age, employment, occupation, and educational level on 29 health variables such as well-balanced diet, exercise, sleep, alcohol use, eating breakfast, smoking, and weight. A secondary purpose of the study was to examine the relationships among the health variables. For example, were the women who smoked more likely to take over-the-counter drugs? The subjects were 636 women who attended a women's health conference in a mid-western town. Significant ($p < .05$) chi square results from the questionnaire indicated that married women had more frequent pap smears and breast self-examination, and were also less likely to use prescription drugs or to overuse drugs. Single women (20% of the sample) reported fewer positive behaviors in these areas. Employed women, 78%, reported fewer positive health habits than unemployed women. Employment was significantly related to eating regular balanced meals (including breakfast), having a nutritious diet, sleeping seven to eight hours per night, and exercising a minimum of three days per week. Health practices significantly related to occupation were nutritious diet, regular balanced meals, sleeping seven to eight hours per night, weight, breast self-examination, visits to physicians, and memberships in women's support groups. Weight control, days and hours of vigorous physical activity, as well as regular pap smears were significantly and negatively related to age. The number of people in a household was significantly related to regular pap smears, nutritious diet and regular balanced meals, with the most positive behaviors being found in three-person households. College-educated women reported significantly less consumption of alcohol, and more frequent breast self-examination, but fewer days and hours of vigorous physical activity. When relationships among health variables were considered, the relationships noted below were significant. Smoking was negatively related to consumption of regular balanced meals (including breakfast), but positively related to alcohol consumption and the use of prescription drugs. Alcohol consumption was significantly and negatively related to nutritious diet, well-balanced meals and sleeping seven to eight hours per night. Overuse of drugs was positively related to alcohol consumption and use of over-the-counter drugs, but negatively related to years of high school health education. Amount of sleep, weight, nutritious diet and fitness were positively related to high school health education. Sixty-three percent of the women reported inadequate high school health education. However, half the sample had one year or less of instruction. Only 20% believed that the schools are now devoting enough time to health education.

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Friday, April 17
1:00-2:15 p.m.

RESULTS FROM THE TAKE THE TEST AMERICA PROJECT. Norris M Russell, Oklahoma Baptist University; Roger H. Grant, Eastern New Mexico University.

This project was sponsored by the National Fitness Foundation in conjunction with the President's Council on Physical Fitness and Sports. The purpose was to raise the level of awareness of health/fitness in the nation as well as to measure the fitness levels and exercise habits of American adults as they relate to individual lifestyle. To accomplish this, test centers were created in 112 major metropolitan areas, and through various advertising techniques, adults were challenged to "Take the Test." The test consisted of a forty item questionnaire designed to elicit exercise/lifestyle information followed by a five item fitness test. The fitness items were a 3-minute step test, the sit and reach test, arm hang test, 1-minute curl up, and 1-minute push up test. The test sample, totaling 20,603, was primarily comprised of professional people in the 30 year old age group who were regular exercisers. The data were sorted based first on gender, then by choice of 12 physical activities, and the means for several items were computed. For instance, men were found to have an average age of 37.2, wt. 170.06, and to have exercised for 1 year or longer. By choice of activity, runners/walkers were found to have a mean age of 39.61, wt. of 149.57, were primarily male (54%), had college degrees, and an average income between $25,000 and $35,000. Among other things, cross tabulation of categorical data revealed many of the sample (45.1%) had never had a physical fitness evaluation, but had exercised vigorously for 30 min., 3 days/wk for 1 year or more (52%). This procedure also revealed that as a group, snow/water skiers had the lowest heart rate response to the step test, whereas aerobic dancers did better on the sit and reach test, baseball/softball players on the arm hang, and weight lifters on the curl up and the push up tests. Many other trends and significant differences among groups were found. Multiple correlation/regression analysis showed several significant predictors of the five fitness test results as well as significant relationships among chosen variables. Other relationships, trends, and descriptive information were also established. Review of the literature revealed that no study of this magnitude and nature had been conducted. It was concluded that significant differences exist among exercisers based on choice of activity which can be related to gender, age, weight, exercise habits, and other lifestyle factors. Suggestions for further study and additional sampling techniques were given.

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Friday, April 17
1:00-2:15 p.m.

BELIEF CHANGES RELATED TO CONTINUATION AND NONCONTINUATION IN AN EXERCISE PROGRAM. Ruth P. Saunders, University of Virginia.

Regular exercise is associated with physical and mental health benefits. Adherence to an exercise routine is assumed to be necessary to obtain the benefits of exercise. Yet, drop-out rates average 40-60% within 3 to 6 months. Prior research has focused on the characteristics of drop-outs or on the prediction of adherence/nonadherence to a program. Few have studied changes in motivation over the course of an exercise program. This information would provide a target for health education intervention at the continuation, as well as initiation stages of an exercise program. This study investigated changes in motivational correlates associated with continuation and noncontinuation in an exercise program (aerobic exercise/dance). Belief strengths of exercise initiators were measured at the beginning of the exercise program and at a 3-month follow-up. At 3 months, the participants were categorized as continuers or noncontinuers. The 20 beliefs were factored into 4 groups: positive health, negative outcome, psychological health, and social outcome. The belief strengths on 2 negative outcome items, and 3 psychological health outcomes, were similar for both groups at the beginning of the exercise program. At the follow-up, the continuers reported significantly stronger beliefs in psychological health outcomes while the noncontinuers reported significantly stronger beliefs in negative outcomes. Three other negative outcome items, the "barrier" items, did not distinguish the two groups, as both groups perceived a parallel increase in these barriers over 3 months. The continuers had significantly higher positive health belief strengths than the noncontinuers, initially and at 3 months. Further study of exercise class procedures are recommended to enable the exerciser to get beyond the more immediate perception of negative outcomes and to realize the psychological benefits of regular exercise. The positive health beliefs were not impacted significantly by experience in a 3 month study; however, the initial differences between the 2 groups suggest the importance of educational intervention with this factor.

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Friday, April 17
1:00-2:15 p.m.

EFFECT OF A WORKSITE SMOKING CESSATION PROGRAM ON PAYMENTS FOR LIFESTYLE RELATED DISEASE.

John Sciacca, Roger Seehafer, Roger Reed, Dallas Mulvaney, and Calvin Berry.

Cigarette smoking is a major preventable cause of illness and is costly to business and industry. Smoking employees have been estimated to cost their employers an additional $200 to $600 each in annual health care expenses. Many businesses, motivated by the belief that worksite health promotion activities may result in healthier employees who utilize company sponsored health insurance less, have initiated employee smoking cessation programs. There is, however, a paucity of scientific research in the area of the effect of worksite smoking cessation programs. This study investigated the effect of participation in the Blue Cross and Blue Shield of Indiana (BCBSI) worksite smoking cessation program on employee health insurance payments for lifestyle related disease.

Subjects for this study consisted of 58 BCBSI employees employed continuously throughout a seven year period. All subjects were covered by a comprehensive health insurance plan during the entire study period. Treatment group subjects (n=29) participated in a health risk appraisal session and a smoking cessation program. Comparison group employees (n=29) participated only in the health risk appraisal session and were matched by smoking and Body Mass Index to control for the possible confounding effects of these variables on disease incidence. The two groups were found to be similar with regards to age and gender. Health insurance payment data for lifestyle related disease were collected for all subjects for a two year pre-program period and a five year post-program period. Analyses were conducted to test the hypothesis that pre to post program increases in health care payments will be less among employees who participated in the smoking cessation program than among risk matched comparisons employees. The results revealed positive, though not highly significant, differences in seven of nine analyses. The results of these analyses provide suggestive evidence of the cost-saving and disease-reducing benefits of a worksite smoking cessation program.

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Friday, April 17
1:00-2:15 p.m.

SIX-MONTH TRENDS IN MILE RUN PERFORMANCE AND HEART DISEASE RISK FACTOR LEVELS DURING A HEART HEALTHY CURRICULUM IN ELEMENTARY SCHOOL CHILDREN: THE "HEART SMART" PROGRAM.

Denise C. Serpas, David W. Harsha, Thomas A. Sellers, LSU Medical Center, National Research and Demonstration Center-Arteriosclerosis (LSUMC, NRDC-A); Stephen J. Virgilio, University of New Orleans; Gerald S. Berenson, LSUMC, NRDC-A.

The purpose of this study was to examine trends in and correlations between one mile run/walk performance and heart disease risk factor levels over a six-month period in 4th 6th grade school children in south Louisiana. Subjects (n=171) participated in the "Heart Smart" Program, a school-based pediatric cardiovascular (CV) risk reduction intervention project. All subjects received a classroom curriculum in CV health education weekly, a CV-healthy school lunch program, and an exercise program entitled Superkids-Superfit. Superkids-Superfit consists of 12 didactic lessons in CV-healthy fitness concepts and activities designed to gradually increase the subjects' level of fitness. Additionally, a year-long fitness program was incorporated into the regular physical education curriculum. Data collection consisted of pre- and post-testing in the one mile run/walk to gauge CV endurance and parallel screening for heart disease risk factor levels: blood pressure, blood lipids, and obesity. Group mean performance was calculated, as well as performance relative to the AAHPERD Health-Related Physical Fitness standards (1980) on age- and sex-specific basis. Also, Pearson Product Moment correlations between performance and risk factor levels were calculated. Results indicated overall improvement ($\bar{x}$ gain) in one mile run/walk times (+34.7 seconds for boys; +61.7 seconds for girls). For the girls, the scores significantly exceeded those changes caused by age alone using the AAHPERD norms. Cardiovascular risk factor levels generally improved: systolic blood pressure, triceps and subscapular skinfold. Diastolic blood pressure and waist circumference increased over the six month period. Data indicated that increases in body size were due to muscularity rather than adiposity. In general, the pattern of change was favorable for CV risk reduction, especially in those measures involving obesity and overweight. This supports the contention that such interventions have positive impacts on children's CV health and fitness.

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Friday, April 17
1:00-2:15 p.m.

AN APPLICATION OF PERSONAL INVESTMENT THEORY TO COMMUNITY EDUCATION INTERNS.

Marlene K. Tappe, Purdue University.

The purposes of this study were to one, delineate the motivational characteristics of health education interns; two, determine if these characteristics change as a result of the internship experience; three, delineate the motivational characteristics of internship situations; four, to assess the relationship between the motivational characteristics of interns and the internship situation; and predict intern personal investment. Personal Investment Theory was chosen to provide the theoretical framework for this investigation. The premise of this cognitive theory is that motivation is influenced by the interaction between the characteristics of both the person and the situation. Seventy-three health education interns from five major universities participated in the study. The investigation was conducted in three phases. The first two phases involved the administration by mail of the Intern Inventory of Personal Investment. The final phase of the study was a telephone survey of a systematic sample of the interns. The data were analyzed utilizing Cronbach's alpha, descriptive statistics, dependent sample t-tests, Pearson product-moment correlation, canonical analyses, and multiple regression. These analyses identified the motivational characteristics of interns and internship contexts. Significant differences ($p < .05$) were found between the interns' pre- and post-internship scores for three of the personal incentive scales. The analysis also allowed for the prediction ($p < .05$) of personal investment from the motivational characteristics of interns, internship contexts, and the congruencies that exist between the motivational characteristics of interns and internship contexts. The telephone survey results corroborated the results generated by the Intern Inventory of Personal Investment. The results supported the utility of the personal investment approach for study of professional field experiences. The information generated can be utilized to further enhance professional preparation programs and field experiences in health education.

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Friday, April 17
1:00-2:15 p.m.

EFFECTS OF SAMPLE SIZE AND NUMBER OF ITEMS ON RELIABILITY COEFFICIENTS IN HEALTH EDUCATION EVALUATION AND RESEARCH.

Mohammad R. Torabi, Indiana University.

The impact of the number of items on the attitude scales and size of the sample to which the scales are administered, as well as methods of estimating reliability coefficients, are very significant areas in health education evaluation and research. The purpose of this study was to determine a minimum number of health attitude items and minimum sample size required to achieve maximum scale reliability coefficients by using different methods of estimating reliability. An Alcohol Attitude Scale for Teenagers, composed of 54 items, was administered to 700 subjects. The scale produced .96 and .91 reliability coefficients by using Cronbach Alpha (CA) and Spearman-Brown (S-B) methods respectively. A computer program was set up to randomly select groups of subjects from the pool of 700 cases using increments of 50 subjects (e.g., 50, 100, 150, etc.). The same method was utilized to randomly select groups of items with increments of 6 items (e.g., 6, 12, etc.). A matrix of coefficients of reliability, using CA and S-B methods, was calculated for different groups of items and sample sizes. To replicate this study, a Cancer Attitude Scale, composed of 30 items, was administered to over 1000 representative subjects and produced reliability coefficients of .94 and .82 by using CA and S-B respectively. The same computer and statistical procedures were repeated for the second data set. The results of both analyses consistently demonstrated that the sample size has an insignificant effect on the coefficient values of reliability. However, representativeness of sample must be established. Furthermore, the coefficients of reliability increased as the number of items reached 18. Adding more items increased the coefficients only in a negligible way. Overall, the CA method consistently produced higher coefficient values for all the above combinations. However, the differences were not substantial. It was concluded that to achieve a reasonably high reliability coefficient for a health attitude scale, a minimum number of 18 items per scale is recommended.

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Friday, April 17
1:00-2:15 p.m.

AN EVALUATION OF THE IMPACT OF PREVENTION/INTERVENTION STRATEGIES UPON HIGH SCHOOL DRUG AND ALCOHOL ABUSE.

Raymond Tricker. University of Kansas: Kevin Beauford. Drug and Alcohol Services, Kansas City, Kansas.

The purpose of this study was to evaluate the impact of drug and alcohol prevention education and drug counseling, as an intervention, upon the substance abuse behaviors of the students in a Kansas high school. The data were collected using three questionnaires and focused upon three major sources of information; 1. the students' perceptions of themselves; 2. the students' perceptions of their dynamic interactions with their parents, peers and teachers; 3. the perceptions of the teachers, based upon their observations of the counseling program related to those students involved in substance abuse. A review and year by year comparison of the trends in student suspensions related to violence and substance abuse (1981-1986) provided a fourth source of information. The suspension data were analyzed by comparing the total numbers of students suspended during the pre-program stage to observe if any increased or decreased trends occurred from the pre-program stage in 1981-1983 to the prevention education stage (1983-1985) (the twenty lesson Here's Looking at You, Two program was implemented for all age groups) and the prevention/intervention counseling stage (1985-1986). The results of the study indicated that most teachers (N=37) reported improved student effort in class and generally agreed that the counseling program had positively influenced those students with a previous history of substance abuse. The student self-evaluation and dynamic relationship with others (analyzed using Pearson chi-square) indicated a positively significant difference between their pre-program and post program perceptions; among the significantly positive results were improved GPA scores, improved school attendance, reduced parent/student and parent/teacher altercations and a decreased number of classes failed. The analysis of the suspension data, including the variables of violence, alcohol, smoking, marijuana, and chewing tobacco revealed significant difference between the pre-prevention (1981-1983), prevention education (1983-1985) and the counseling and education stage (1985-1986). These results indicated that a significant improvement had occurred from 1981-1986 with a steady and significant decrease in the number of substance abuse suspensions over the five years studied. Future developments in the program should involve more faculty members via in-school inservice to provide a stronger support for the existing program.

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Friday, April 17
1:00 - 2:15 p.m.

IS THE TAXONOMY OF EDUCATIONAL OBJECTIVES A VALID THEORETICAL MODEL FOR HEALTH EDUCATION?

Robert F. Valois, Ph.D., M.P.H. Eastern Illinois University

It is not surprising that theoretical models are seized upon eagerly by both researchers and practioners in health education. Any device which makes it possible to think with greater operational specificity is valuable. What is dangerous, is an uncritical acceptance of the model. The objective of this study was to validate the Taxonomy of Educational Objectives in Health Education research. Subjects in this study included 396 students from all classes of personal health and 110 from english & math (exp vs. con) at a midwestern university. A 138 item Health Knowledge & Attitude Scale was utilized to assess cognitive & affective outcomes via hierarchical sturcture of the Taxonomy of Educational Objectives. The instrument was pilot tested and evaluated by educational experts and declared construct and content valid. Research design: pretest-posttest experimental/control group design, subjects matched across time. Data analysis was four-phased: Phase I evaluated cognitive & Affective course outcomes via 3-way ANOVAS, Phase II examined the relationship between cognitive & affective outcomes via Pearson Correlation, Phase III assessed the relation between taxonomic levels via Discriminant Analysis of the affective subscale $\bar{X}$ scores compared with affective subscale $\bar{X}$ scores followed by 4 univariate F-tests using Wilks Lambda (U-Stat). Phase IV included comparison of $\bar{X}$ scores for all taxonomic levels (cog & aff), a correlation matrix comparing levels of cognitive learning and affective internalization followed by a least squares "simplex scaling" technique (Kaiser 1962). Significant $p < .01$ time x group ANOVAS, moderate positive correlations that fit the simplex scaling framework, a linear relationship between performance at the different levels of the cognitive and affective domains and an overall pattern of higher affective performance at higher levels of cognition gave creedence to this learning theory. Based on the findings of this study a relationship appears to exist between the cognitive and affective domains, they are parallel in nature and there is an intimate relationship between cognitive learning and affective internalization. This relationship exists at the knowledge -receiving levels as well as the analysis-synthesis/organization levels. The Taxonomy of Educational Objectives is a valid and useful model within the field of Health Education. The constructs of the model have emperical referents among cognitive and affective educational objectives, and the hierarchical structure of these inferents corresponds to that claimed by this theory of learning. The Taxonomy of Educational Objectives is also a valuable model for planning, implementing and evaluating health education and health promotion programs.

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Friday, April 17
1:00 - 2:15 p.m.

UTILIZING CAUSE DELETED LIFE TABLES TO CALCULATE POPULATION LONGEVITY RELATIVE TO CIGARETTE SMOKING CESSATION.

Alex Waigandt, University of Houston; James Brown, University of Missouri; Dale Evans, University of Houston; Bonnie Zabrek, University of Houston.

Approximately 53 million Americans are willing victims of one of the most destructive substances in the environment--cigarette smoke. The Surgeon General's call for a smoke-free society raises questions about the decrease in pathology and the resultant increase in longevity. The purpose of this study was to estimate the health effects of cigarette smoking cessation. Three of the major causes of death are malignant neoplasms, major cardiovascular diseases and chronic obstructive pulmonary diseases. Combined, these causes account for over 73 percent of all deaths in the United States. It is estimated that approximately 25 percent of neoplastic deaths, 30 percent of cardiovascular deaths and 90 percent of COPD deaths are related to cigarette smoking. The proportion of mortality documented in the professional literature relative to cigarette smoking was extrapolated from the vital statistics data by age group and gender. The product mortality and data from the US Census were utilized to calculate cause deleted life tables which permit separation of competing effects of major changes in mortality. An analysis of competing risks consists of decomposition of the life table probability of surviving from age x to x+n, into component terms estimated from total deaths and deaths for the specific cause. The cause deleted life tables were developed utilizing the computer facilities at the University of Texas Health Science Center, Houston, Texas. Calculations based upon public health data and cause deletion indicate increases in population life expectancy due to smoking cessation of 2.0046 years for males and 1.5606 years for females.

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Friday, April 17
1:00-2:15 p.m.

RELATIONSHIP BETWEEN SELF-CONTROL AND ALCOHOL CONSUMPTION PATTERNS AND PROBLEMS OF COLLEGE STUDENTS. Chudley E. Werch, Ph.D., University of Arkansas; Dean Gorman, Ph.D., University of Arkansas.

The purpose of this study was to examine the relationships among internal and external self-control strategies, alcohol problems, and the quantity and frequency of alcohol use. Studies of the self-control of alcohol use in real-life settings are expected to lead to a better understanding of what specific procedures are being employed to control the adverse effects of alcohol use. A total of 410 randomly selected students participated in this study. All subjects were sent a Student Alcohol Questionnaire, and a Self-Control Questionnaire. The Student Alcohol Questionnaire (Engs, 1977) included measures of quantity and frequency of alcohol consumption (6 items), frequency of alcohol problems (17 items), and demographic variables. Test-retest reliability for this instrument was found acceptable (r = .79, Engs, 1977). The Self-Control Questionnaire (Werch, 1985) included measures of external self-control strategies (37 items), and internal self-control standards (14 items). Test-retest reliability for the internal and external self-control measures was high (r = .96), based on results from a group of university students. Stepwise multiple regression analyses of alcohol problems by self-control strategies showed the following: 1) the external self-control behaviors aimed at managing food consumption and setting time constraints while drinking were most highly correlated ($p < .05$) with alcohol problems, with combined external self-control behaviors accounting for up to 24% of the explained variance of some alcohol problems, and 2) the internal self-control score related to relaxation was most predictive ($p < .05$) of alcohol problems, with combined internal self-control scores accounting for as much as 15% of the variance for some problems. Analysis of variance tests showed significant differences for seven of the eight external self-control strategies across quantity-frequency levels ($p < .0001$). Significant ANOVAs were found across quantity-frequency levels for the total internal self-control score $F(5,294) = 3.09$, $p < .009$, and the relaxation score $F(5,294) = 4.77$, $p < .0003$. Analysis of variance tests showed significant differences in two of the eight external self-control strategies across problem/non-problem drinking status ($p < .0001$), and significant differences in all four of the internal self-control scores across problem status ($p < .01$). Since self-control was found to be a significant predictor of alcohol problems and consumption, self-control strategies should be examined as potentially useful components of alcohol interventions aimed at college-aged populations.

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